THE DENTAL DIGEST

JUNE, 1939

S. S. WHITE CASTING GOLDS

"Thoroughly tested for Dental Service"

FOR INLAYS AND ¾ CROWNS

Outstanding Resistance to Tarnish

820 HARD

For inlays, ¾ crowns, pinlays, cast bridge abutments and pontics.

Melting range 1591° F.—1781° F.

Light coin gold color

$2.02 PER DWT.

Supplied ½ dwt. nuggets

860 HARD

Developed especially for ¾ crowns.
A superior gold for any type of inlay, including slice-lock preparations, pinlays, pinledges, onlays, occlusal restorations, crowns, bridge abutments and pontics.

Melting range 1655° F.—1843° F.

Color, golden hue coin

$2.15 PER DWT.

Supplied ½ dwt. nuggets

"ALL-PURPOSE" GOLDS

No. 3 EXTRA HARD

For partials of any design and by any technique; for inlays, ¾ crowns, pinlays, pinledges and slice preparations.

Melting range 1598° F.—1769° F.

Color, rich golden coin

$1.95 PER DWT.

Supplied 2 dwt. ingots

No. 19

The low cost of No. 19 puts precious metal restorations within the means of everyone. It has the required strength for any dental restoration, and its resistance to discoloration rivals that of many of the finest casting golds.

For one-piece castings of any design, either the high or low heat casting techniques; for extra hard inlays, three-quarter crowns, cast bridge abutments and bridge pontics.

Melting range 1505° F.—1620° F.

Color, light gold color

$1.60 PER DWT.

Supplied 2 dwt. ingots

For Sale at Dental Depots

THE S. S. WHITE DENTAL MFG. CO., 211 South 12th Street, Philadelphia, Pa.

About Our CONTRIBUTORS

BERNARD D. HETRICK, D.D.S. contributed PATIENT INGENUITY to this magazine last month. His present article on FULL DENTURES initiates a series under the general title of PROCESSING THE ACRYLICS. The next article on this subject will give the technique for changing any denture to a different material, as from a vulcanite to an acrylic resin. This includes (1) maintaining the original set-up and bite, (2) gaining proper palatal thickness, (3) any necessary additions, such as festooning or rugae, and (4) refitting such a denture. This article will also consider the processing of transparent palate dentures, giving the technique for a controllable line between the pink and the transparent material. The entire denture is processed on the original model without the loss of any palatal material.

•

LOUIS I. GROSSMAN, D.D.S., Dr. med. dent. (University of Rostock, 1928), described A HOME-MADE INCUBATOR FOR BACTERIOLOGIC CULTURES here last December. Doctor Grossman's present article will delight physicists among our readers. His co-author A. L. CHARNY, E.E. is a graduate of the Moore School of Electrical Engineering of the University of Pennsylvania and is an electrical engineer associated with the Philadelphia Bell Telephone Company.

•

FRED R. FELCHER, D.D.S. wrote for us in January, 1937, on PLATINUM REINFORCED PORCELAIN RESTORATIONS. This month, Doctor Felcher furthers his practical suggestions on the use of porcelain in describing a SHOULDERLESS LINGUAL REINFORCED JACKET CROWN.

•

WALTER CARL SHULL received his D.D.S. in 1917 from the Kansas City-Western Dental College. Doctor Shull worked in a cooperative group on castings, under the United States Bureau of Standards. He makes his practical introduction to these pages with FIXED BRIDGES CAST IN ONE PIECE.

•

CLAUDE E. ZoBELL, Ph.D. (Hooper Foundation for Medical Research) is an assistant professor of microbiology at the University of California who is currently a visiting professor, studying on sabbatical leave in the department of bacteriology of the University of Wisconsin. Doctor ZoBell has taken an active interest in dental hygiene as an outgrowth of his investigations on Vincent's infection. The second author, MR. CLYDE MCMORROW has the A.B. degree in bacteriology and is now working for his M.D. degree. The third author, MISS ELMA MORRIS, is a member of the Society of American Bacteriologists and has the Certificate of Proficiency as a bacteriology technician. Doctor Martha Welpton provided the laboratory headquarters in her office for part of the investigations described in BACTERIOLOGY OF THE DENTAL HANDPIECE. DIGEST readers will recall a related article, published here last February by F. H. Bimrose, D.D.S. on MAINTAINING STERILITY OF THE DENTAL HANDPIECE. This instrument, so long neglected as a source of infection, is at last receiving careful attention.

THE DENTAL DIGEST

VOL. 45 — June, 1939 — NO. 6

Processing the Acrylics: Full Dentures - - - 216
Bernard D. Hetrick, D.D.S.

Announcement of Books Received - - - - 222

A Combined Electrolyzer (Ionization Apparatus) and Pulp Tester for Alternating Current Supply - - - - - - - - 223
Louis I. Grossman, D.D.S. and A. L. Charny, E.E.

Shoulderless Lingual Reinforced Jacket Crown - 226
Fred R. Felcher, D.D.S.

Fixed Bridges Cast in One Piece - - - - 230
Walter C. Shull, D.D.S.

The Editor's Page - - - - - - - - 233

Bacteriology of the Dental Handpiece - - - 234
Claude E. ZoBell, Ph.D., Clyde McMorrow, A.B., and Elma Morris

Notes on the Cuff - - - - - - - - 240

Edward J. Ryan, B.S., D.D.S., *Editor*
Ethel H. Davis, A.B., *Assistant Editor*
708 Church Street, Evanston, Illinois

SEE PAGE 256 FOR SUBSCRIPTION DATA, ETC.

Processing the Acrylics: Full Dentures

BERNARD D. HETRICK, D.D.S., Butler, Pennsylvania

WITH THE ADVENT of the acrylic resins in the field of dental prosthesis and recent improvements in both the esthetics and mechanics of artificial teeth, dentists are prepared to offer a service in the replacement of the natural dentition which far surpasses anything the dental profession has ever before achieved.

The acrylic resins are neither thermoplastic alone nor thermoset alone but rather combine these two properties.

Most manufacturers of acrylic resins advise the use of the vulcanizer in the processing of these materials in order to break down or disintegrate the investing materials, thereby making recovery of the denture from the flask more convenient. Resorting to the use of the vulcanizer for this purpose makes necessary a perfect foiling operation; steam must be excluded from the curing denture to prevent white or blanched spots caused by condensed steam imprisoned within the material. Even with perfect foiling, a small air bubble against the foil in investing will cause disastrous results. In boiling and examining two dentures, one cured by boiling and the other processed in the vulcanizer, the boiled denture appears to have more resilience than the one processed in the vulcanizer. There is no apparent difference, however, after they are again cooled, but a repetition of the test will show the denture that has not been placed in the vulcanizer to be more favorable.

The acrylic resins are processable in boiling water without danger of white spots caused by imperfect foiling or the presence of bubbles.

The purpose of this article is (1) to describe a process of flasking and deflasking that will make possible a safe recovery of a cured acrylic resin denture from an investment that has not been subjected to steam pressure, and (2) to simplify the foiling operation. Several other innovations in processing dentures of the acrylic resin group will also be considered.

The discussion here will concern a denture in a waxed state with correct articulation and set-up of anteriors. Such a denture, in an average case, has one thickness of base-plate wax on the palatal surface and two thicknesses of such wax on the labio-buccal surface. The contouring and festooning of the denture must compare favorably with professional laboratory results.

Technique

Waxing—1. A piece of ordinary wrapping twine is waxed by drawing it through a lump of softened wax. With a small wax spatula one end of this twine is fastened between the cuspid and first bicuspid on the palatal surface. The twine is attached around the gum-line of each tooth posteriorly, sealing with the hot spatula as one proceeds, continuing completely around the second molar, and burying the twine in the wax on the distal of the second molar. The twine is brought to the surface of the wax at the disto-buccal surface of the second molar and continued around the gum-line of each successive tooth on the bucco-labial surface, then around the opposite second molar to the palatal surface. Finish by sealing the end of the twine between the first bicuspid and the cuspid on the opposite side from where the operation was begun (Figs. 1, 2, and 3).

2. Select a commercial rugae foil; cut off and discard lugs and adapt the foil to the proper position, using a ball burnisher and pressing only at the indentations to adapt it to the palatal wax. Remove the adapted rugae foil and fill the reverse of the rugae with hard sticky wax to prevent depressing the rugae when burnishing the complete foil for the palate (Fig. 4). Fasten this rugae foil with a hot spatula to the palatal wax.

3. Adapt the wax around the lingual of the bicuspids and molars as shown in Fig. 5, using the twine as the gingival termination thereof. Work this wax out to a featheredge on the palate to facilitate finishing the denture. In Fig. 5 the added wax seen was inlay wax; either this inlay wax or a green, base-plate wax will identify the added wax and prevent making a thin spot in case it is necessary to remove an excess of wax to get the desired result. Proceeding to the labial, festoon by adding wax to restore the contour caused by natural roots of the teeth. To prevent too symmetrical an appearance, incline the lateral festooning distally a little and the cuspid festooning a little more so. Best results are had by adding melted wax with the spoon end of a small spatula, keeping the blade parallel with the root festoon being restored. Any

---

Figs. 1, 2 and 3—Progressive steps in applying common twine at gingival as a basis for festooning.

Fig. 4—Adapting rugae foil to palatal wax with ball burnisher.

Fig. 5—Completed palatal waxing with rugae foil in place.

Fig. 6—Waxing and festooning completed.

Fig. 7—Saddler's knife used in trimming cast.

Fig. 8—Saddler's knife in use.

Fig. 9—Method of trimming cast to facili tate opening of flask after curing.

Fig. 10—Carpenter's coping saw used in cutting grooves shown in Fig. 9, and in removal of investment from flask.

Fig. 11—First half of investment.

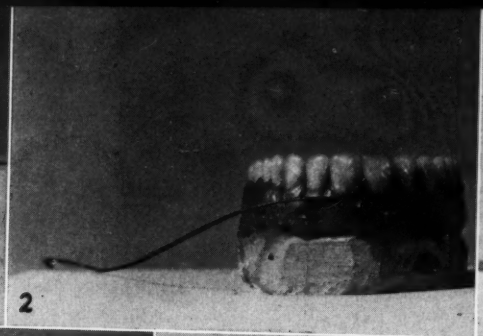
Fig. 12—Method of cutting foil.

Fig. 13—Completed labio-buccal waxing; cement used, and improvised foiling tool.

Fig. 14—Plaster removed from second half of investment, exposing occlusal and incisal edges of teeth. This space is filled with artificial stone to prevent tooth-shifting.

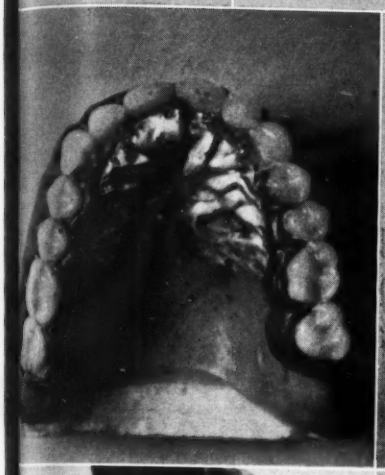
Fig. 15—Ring half of flask after removing wax and twine.

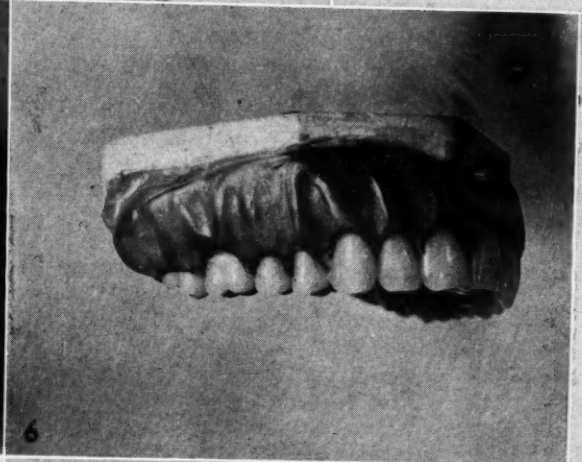
Fig. 16—Bucco-labial foiling of cast.


2

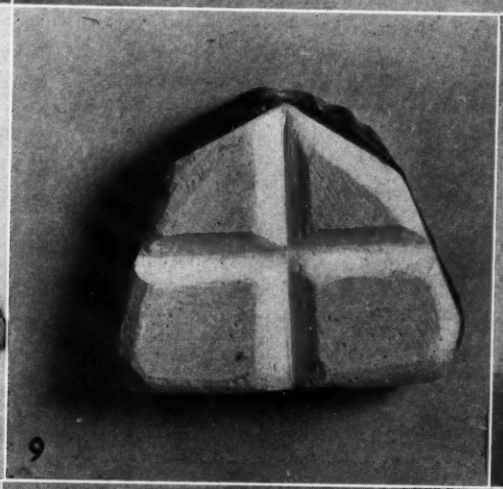
3

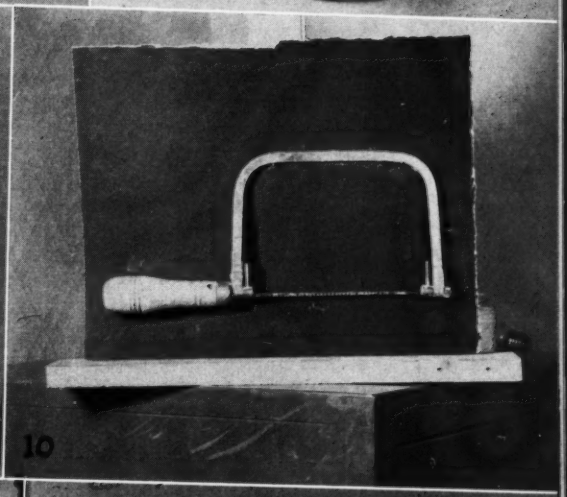
4

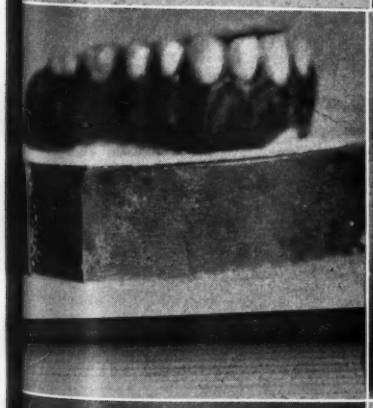


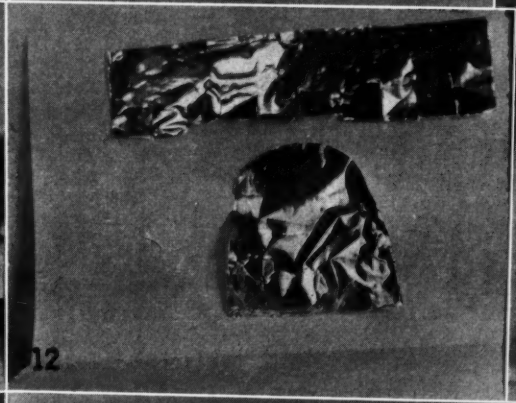

6

7

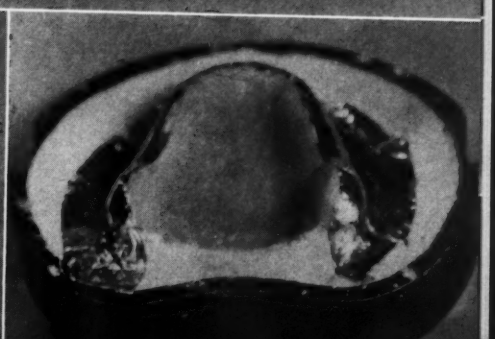

9


10




12

COLD PATCHING CEMENT
GOODYEAR
MADE IN U.S.A.



excess of wax should be scraped away slowly with a small Kingsley scraper or a cold spatula. Figs. 5 and 6 show the completed waxing.

4. Fig. 7 shows a saddler's knife[1] used in trimming the cast. The actual trimming is shown in Fig. 8. A tapering form is needed; tapering is done from the periphery of the wax to the base of the cast. Two V-shaped grooves are cut in the base of the cast: one, transversely over the second bicuspids, and the other, on the median line (Fig. 9). These grooves are cut with a carpenter's coping saw (Fig. 10). The saddler's knife may be obtained through a local harness-maker or the harness division of several national mail order houses. The coping saw is found at any hardware counter where additional blades may also be purchased.

5. Select a good flask, preferably one with a shallow base and a high ring. Coat the base of the cast with a good separating medium, preferably liquid silex, or apply tin foil to this surface. Invest the cast with the periphery of the wax on a level with the base of the flask having a flat land. "Land" is that portion of the invested case (Fig. 11) which is of plaster and, on the ring half or upper portion of the case, that portion of the investment which approximates this first described "land."

Foiling Labial and Palatal Wax—6. The concern here is to produce a clean dense surface on the denture. The prevention of steam leaks is of no particular concern, for little or no steam is generated in a boiling case. For this reason use .001 foil both on the wax and on the cast. This foil is easily adapted and is efficacious. Cut only two pieces of foil for this waxing, as shown in Fig. 12. The upper length is the full width of the roll and of sufficient breadth to extend from the incisal-occlusal edges of the teeth to the cast-land junction and three-fourths inch onto the land. Along one edge of this piece, cut slits, three-fourths inch deep and at three-fourths inch intervals. The lower foil shape is shown and is cut amply large for the palate. These two pieces are coated with cold patching cement, such as is used in the patching of auto inner tubes. Also coat the land, the labio-buccal and palatal surfaces of the teeth, and the rugae foil. After the solvent has evaporated from the cement, begin the foiling by attaching the long piece, placing its center at the median line and midway between the periphery and gingival margin on the labial surface. Adapt the foil posteriorly on both sides of the waxed denture, and seal the foil to the wax only at one point midway between the periphery and the gingival margin. With a foiling tool, made from a large wooden knitting needle, adapt the foil from the attached point down over the periphery and onto the land. The foil should be adapted as one proceeds. Be careful not to trap air under the foil or to seal the foil where it has to be moved. Re-handling of foil creates difficulty. The knitting needle referred to is left as it is on its point before cutting the needle to a length of 7 inches. The cut-off end is rounded with a knife and finished with fine sandpaper. Having finished down and onto the land, adapt the foil up to the gingival margin and onto the teeth, sealing only on the vertical axes of the teeth. With a small knife, starting immediately above the twine on the wax-up, cut slits over each tooth along the center of the vertical axes and to the occluso-incisal edges of the teeth. With the small end of the foiling tool, adapt foil into the interproximal spaces, and cut the foil off one-third down from the occluso-incisal edges.

7. Place cold patching cement around the foil on the tuberosity area where the palatal foil will overlap.

8. Form the palatal foil into the shape of a shallow cup and attach on the rugae foil. From this point, the operator works in all directions, adapting as he proceeds toward and onto the teeth. Slits, cut with the small knife on vertical axes of teeth, also help on the palatal; the foiling is ended just short of the occluso-incisal edges. Fig. 13 shows the finished labial foiling, the cement used, and the foiling tool. Final finish of foiling may be made with cotton held in fingers (sharp finger nails will cut the foil) and cotton held in lock tweezers.

Investing Ring-Half of Flask—9. The patching cement applied to the land of the cast-half of the flask acts as a separating medium where the foil does not cover the land. Place the ring of flask and pour with well-spatulated laboratory plaster of a good grade. As the plaster begins to set, with the round end of a large wax spatula, or a large Kingsley scraper, remove the width of the tool used over the occlusal and incisal surfaces of the teeth, exposing these surfaces, and finish with a wet bristle brush, thoroughly cleaning these surfaces of the teeth (Fig. 14). Pour into this space a good artificial stone and place the top on the flask. The artificial stone prevents shifting of the teeth when flask-closing pressure is applied, and when expansion occurs in processing material.

10. The investment having properly set, boil the case, eliminate the wax, and remove rugae foil (Fig. 15). The twine is also discarded at this time. The impression of the rugae foil in the palatal foiling will provide rugae without the danger of a loose rugae foil in the curing denture.

Fig. 17—Completed cast foiling.

Fig. 18—Pattern of acrylic material preparatory to packing case. Red carding wax used to take care of loss in exposing acrylic resin to hot lights during photography.

Fig. 19—Acrylic material assumes improper position for packing.

Fig. 20—Acrylic resin held in position with dental floss attached to closure guides.

Fig. 21—Cutting dental floss preparatory to removal, with flask partly closed.

Fig. 22—Insufficient material over left bicuspids. Methods of remedying this situation explained in text.

Fig. 23—Packing completed.

Fig. 24—Use of flask press. Note use of iron washer to prevent centralized strain on flask.

Fig. 25—Closing spring stage compress.

Fig. 26—First opening of flask after curing.

Fig. 27—Sawing of investment from ring half of flask.

Fig. 28—Investment removed, containing denture; remainder of investment in ring of flask.

Fig. 29—Splitting investment from denture after scoring with coping saw.

Fig. 30—Sectional removal of model from denture.

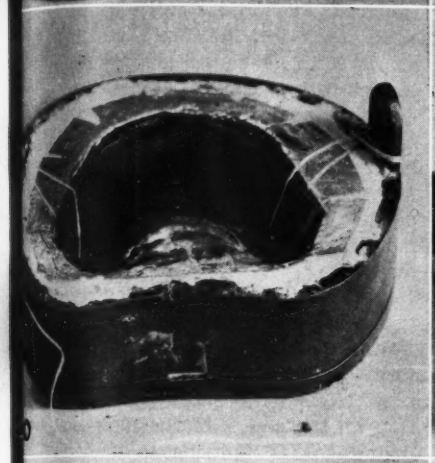
Fig. 31—Denture after stripping away foil.

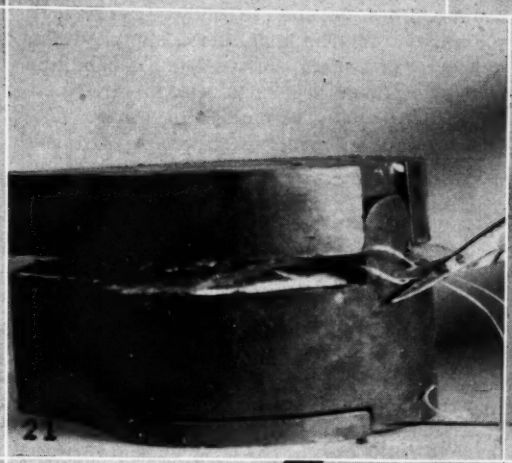
Fig. 32—Completed denture.

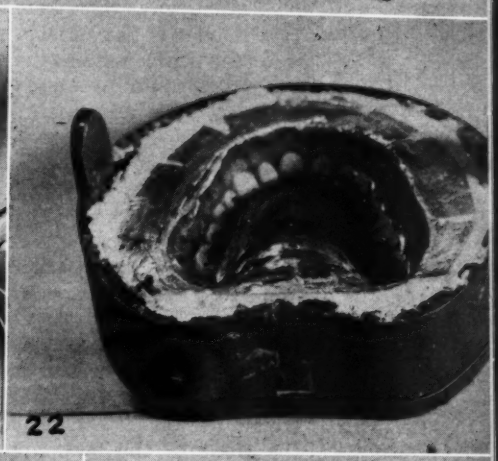
[1]Campbell, D.D.: Full Denture Prosthesis. St. Louis, C. V. Mosby Company, 1924.

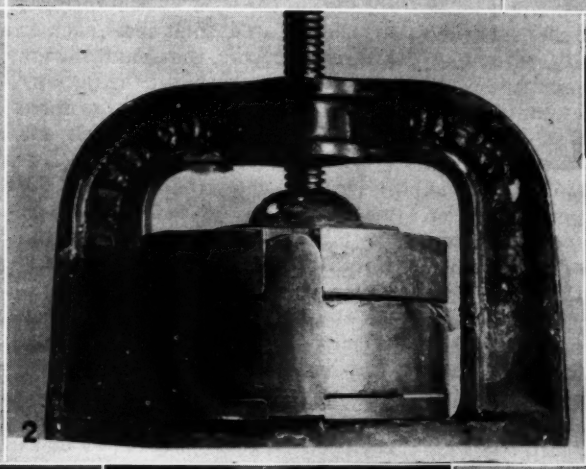
18

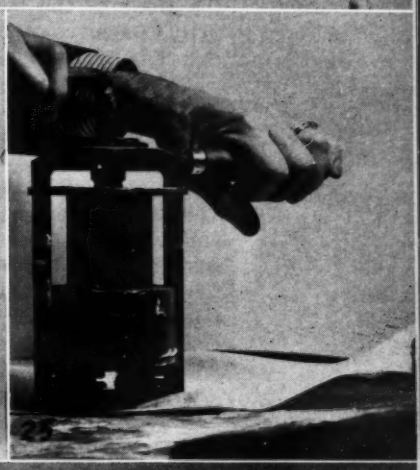
19

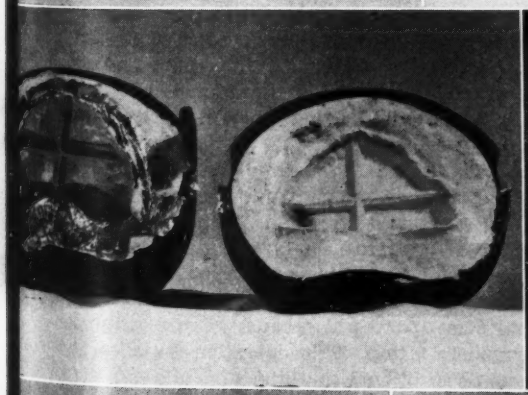



21

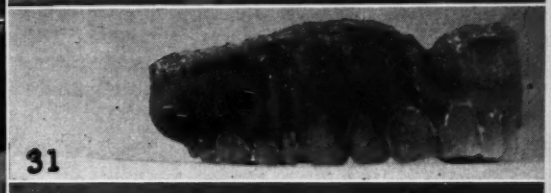

22

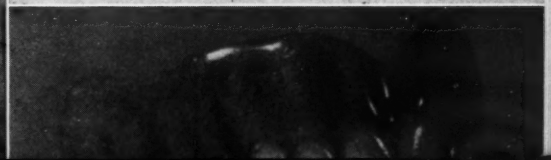

2


23



28


31



Flush out case with commercial acetone to remove residual wax and then with commercial chloroform. All tinfoil surfaces should be wiped clean with chloroform on cotton held in a pair of tweezers, to remove excess patching cement. Any loose teeth should be reset with clear household cement having a celluloid base, carefully wiping any excess from the foil. This cement is not suitable for any case that is processed in the vulcanizer except vulcanite.

Foiling Cast—11. Clean the cast with chloroform and coat it entirely with cold patching cement. Any sharp edges at the cast-land junction should be removed.

12. Here again foiling is done with only two pieces of foil which are cut and prepared the same as for foiling the wax (Fig. 12). These are also coated on one side with cold patching cement. After the solvent in the cement has evaporated, start with the labial foil and attach its center at the front of the cast, applying it so that the base of the slits are at the cast-land junction (Fig. 16). Adapt while proceeding, trimming the foil to end at the crest of the ridge or below. Apply cold patching cement at tuberosities and at the edge of the bucco-labial foil and await its drying. Then slightly cup the palatal section and seal at the center of the palate. Burnish in all directions keeping the foil even and trim so that the palatal foil will overlap the labial foil one eighth of an inch (Fig. 17). It will be noted that this method of foiling leaves no edges or seams exposed to pressure of pressing of uncured denture material. Rather such edges are so presented that the pressure of the material will make the seam even tighter; the surface will resemble the courses of shingles on a roof. Any punctures or torn sections must be repaired by applying patching cement around faulty areas and applying a patch which is also cemented and allowed to dry before patching is done. Avoid sharp corners on patches.

Packing the Acrylic Resin—Because of the loss in exposing acrylic resin to hot lights which were necessary in photographing this material, operations were conducted with red carding wax. After packing was completed, this wax was eliminated by boiling and identical steps were taken in the acrylic resin.

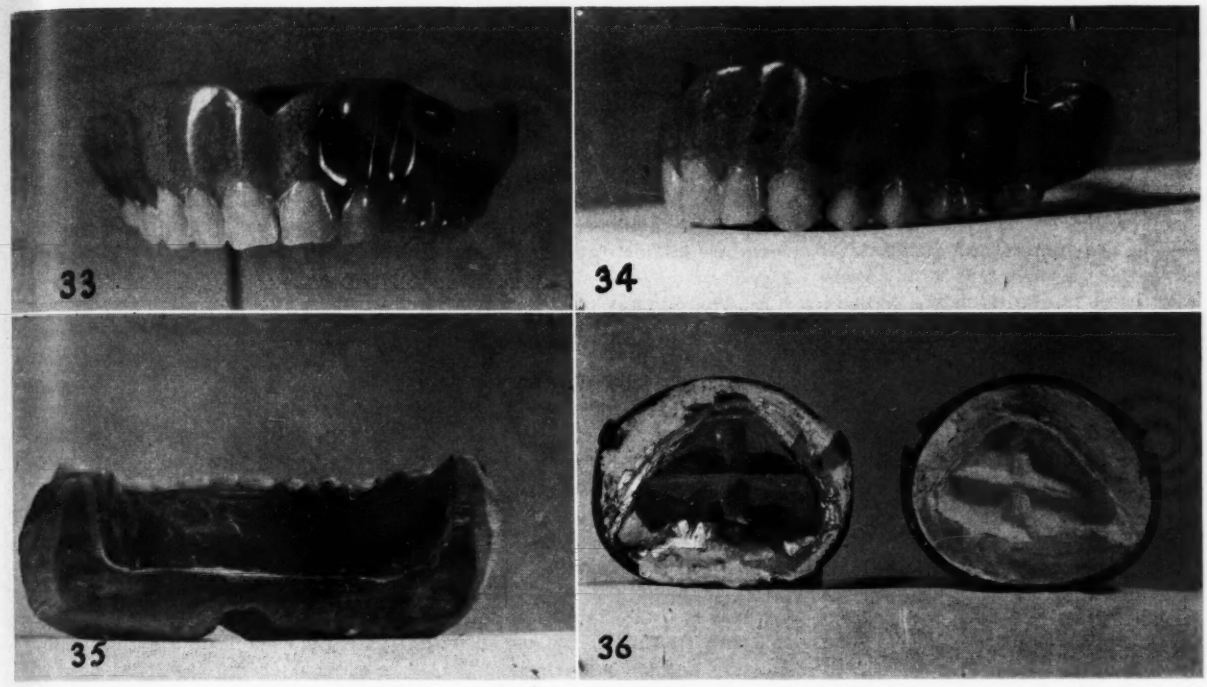
13. The cutting of the acrylic resin is shown in Fig. 18. The labial piece is cut sufficiently wide for the height of the denture rim and length of the acrylic unit. The piece for the palate is cut oblong according to the size of the case, and two triangular pieces are cut off as shown in Fig. 18.

14. The labial piece is applied first and there is often found a condition shown in Fig. 19. The material persists in assuming a position that makes packing impossible and this difficulty is shown solved in Fig. 20. Pieces of dental floss are looped over ends of material and twisted around the closure guides. The cast half of the flask is placed in position and the case closed far enough to engage the acrylic resin. One strand of the dental floss is then cut as in Fig. 21, the floss withdrawn, and the closure completed. On the closure a piece of wet cellophane is used to permit inspection of the flask without disturbing the foil. In difficult cases, such as protruded uppers, the dental floss is allowed to remain until the packing is completed, and as many as three loops of floss are made on each side of the denture. By engaging the anterior portion of the cast first the material can be forced to position on the labial. The rounded ends of the closure guides direct the cast to position. As is not the case with vulcanite, the flask is not chilled between packing operations. If the material does not press well, immerse the flask in boiling water for one minute. The palatal piece is applied next and the two triangular pieces are used at the tuberosities.

15. In removing floss, if left in position until the packing operation is completed, cut one strand of the floss at the edge of the acrylic resin to prevent dragging soiled floss through the material. The small amount of wax in the floss has no effect on the finished case. In Fig. 22 over the left first and second bicuspids is seen a condition that often arises: The material is short at the periphery and if an additional piece is placed in the vacant position there will be a grain seam. This seam does not detract from the strength of the denture and will not be noticeable in the mouth, but the patient will often insist that a crack in the denture exists. This condition can be remedied by ignoring it until the packing is otherwise completed, then placing additional material over the teeth themselves in this area. This will cause the material placed first to fill this space without a grain seam. Another solution is to use dental floss anchored to the closure guide to raise the material. The acrylic resin can be teased away from the foil with a clean instrument, sufficient to insert the floss, when it will again resume its pressed position. Fig. 23 shows the packing completed. Any excess material should be clipped away with clean scissors and removed from the land of the investment.

In Fig. 24 the use of a bench press in the closure operation is illustrated. I always use a 1 inch iron washer between the flask and the screw of the press to prevent concentrated pressure on the center of the flask. A 1 inch washer is 2¼ inches in diameter and serves admirably for this purpose. Concentrated pressure on the center of the flask causes both flask distortion and tooth breakages. More will be said about tooth breakage later in this article. It is always advisable to make one opening of the flask after removing material from the land as this allows the flask to seat further and may disclose further discrepancies in the packing. On the final closure a piece of the acrylic resin is cut as wide as the unit is thick and long enough to extend the length of the diatorics. This is placed directly over the diatorics to assure complete attachment of the teeth to the denture. On the final closure of lower dentures a piece of the acrylic resin about 1 inch long and about one-half inch wide is split to half the original thickness with a razor blade.

Lift the resin away from the foil on the lingual in the second bicuspid and first molar region and insert one such piece on each side of the denture. This will prevent an air pocket which is often trapped in this area and which causes a void in the denture. This operation supplies additional material and allows such air to escape. Hurried packing of a flask that is too cold is also a contributory cause to trapping of air.



Figs. 33 and 34—Additional views of completed denture.
Fig. 35—Floor in base of lower model.

Fig. 36—First opening of flask on practical lower case.

16. The case, having been completely packed and compressed in the bench press, is transferred to the spring compress for curing. The tightening down of the spring compress is shown in Fig. 25. The spring compress is tightened until it stops and is then released one and a half turns to secure maximum pressure and at the same time to allow for expansion and relaxation of the flask. It is strongly advisable to use a good spring stage spring compress for processing the acrylics. Some sort of spring compress is imperative. A pressure of 300 pounds is said to be exerted by the processing acrylic resin at one stage of the curing. An excellent spring compress is necessary to follow the relapse of this pressure.

Curing—The advice of the manufacturer should be consulted for boiling time and a preheating at 170° F. for thirty minutes will improve the case. The reason for this preheating is that the material has what the makers of the acrylic resin call a "kickover" at 180°. Then the material undergoes a forceful expansion followed by a relaxation at this temperature; preheating allows this change to occur simultaneously in all parts of the curing case. This preheating will solve many difficulties of voids on the lingual of bulky lowers. After this preheating period the case should be slowly raised to the boiling point and allowed to boil for the time recommended by the maker of the acrylic material. Cases processed according to this technique should not be cured in the vulcanizer. For steam pressure cases, a steam-tight foiling operation is imperative and .003 foil should be used on the labial. It is advisable to apply a dense fine-grained investment material on the labial, with a brush, to the thickness of at least one-fourth inch, before setting the ring and filling the flask should curing be done in the vulcanizer.

Recovery of Denture—17. When the denture has been cured, it is cooled slowly; the flask is allowed to cool thoroughly at room temperature. When this has been accomplished, insert a knife blade to open the flask. It will be found that the model pulls out of the base of the flask and remains in the denture as shown in Fig. 26. Any attempt to remove the model at this stage will result in the anterior teeth being cracked along the pin line, because of the existing undercut after the model was pulled out of the base of the flask.

18. Drill a hole through the investment close to the ring of the flask. A small twist drill in the bur chuck of the lathe will serve this purpose. Dismount the blade from the coping saw (Fig. 10) and reassemble the saw with the handle on the model side of the investment. Saw completely around the investment, as shown in Fig. 27, and remove the contents of the ring of the flask (Fig. 28).

19. Placing the model side down on the bench, make a cut on the right side with the line of the cut over the cuspid-to-molar line and stop when the saw blade is felt to strike the teeth. With a small knife, fracture the buccal portion of the investment and thus disclose the buccal foil (Fig. 29). Make additional cuts and fractures cuspid-to-cuspid and left-cuspid-to-left-molar region. In case of rounded anteriors, make two cuts anteriorly: one, cuspid-to-median line and one, median-line-to-cuspid.

20. The labio-buccal portion of in-

vestment having been removed, insert the point of a knife blade over the first molar and with an upward pry remove the entire palatal investment.

Removing Model—21. Make two cuts with a saw in the bases of V-shaped grooves. Be careful not to damage the denture at the periphery and at the frenum and post-palatal edge. Deepen these cuts with a knife and insert the knife on the right of the transverse cut, applying pressure posteriorly. If slight pressure does not fracture a fourth of the model away, deepen the cuts until this result may be obtained.

22. Remove the section on the left of the denture and then the two front sections of the model. The beginning of this operation is shown in Fig. 30. The recovered denture is shown in Fig. 31, the foil having been stripped away.

Finishing Denture—23. A good wax-up and foiling operation will minimize the finishing process and time spent. Acrylic resin dentures are difficult to cut with chisels or scrapers and finishing is best accomplished with arbor bands for the periphery; burs for around the teeth, and mounted stones for other surfaces on a contoured and festooned denture. Finishing is done so that a minimum of pumicing will be necessary, for the acrylic resins cut away readily under pumice. The final polishing may be accomplished with commercial polishes. The acrylics have finished well under any polish that I have tried.

24. In Figs. 32, 33 and 34 are seen three views of the finished denture. The limitations of black and white photography precludes a true portrayal of the finished appearance.

Lower Dentures—25. A floor, of the same material as the model, should be placed in the model (Fig. 35). Completely cover this floor with foil. The model should be prepared with a rather shallow taper as shown in Fig. 35.

26. The opening of the flask after curing on a practical lower case is shown in Fig. 36.

27. In recovery from investment on a lower case the labio-buccal cuts are made as for an upper case. A V-shaped cut is made in the center of the lingual and the V-shaped piece removed. The remaining portion of the investment can then be sprung away from the denture.

28. The model is removed by making cuts at three-fourths inch intervals and fracturing the model with pressure applied posteriorly.

Comment—If the acrylic resin used comes in a screw top jar sealed with cellulose tape, discard this tape on every resealing and use a new piece of tape. This tape may be obtained from any good stationery counter.

Breakage of Teeth

Breakage of teeth results from one of three causes: The first is from uneven pressure on the flask. This was considered earlier in this article. The second is from setting the ridge lap of teeth directly against the model and then adding foil to the model to occupy a space that will no longer remain when the flask is fully closed. A narrow strip of cellulose tape placed on the model in this area before the set-up will provide space for the foil. If discarded when the case is foiled, this tape will prevent tooth breakage from this cause. The third and perhaps the most frequent cause of tooth breakage in the processing of the acrylics is the close approximation of the posterior teeth in the wax-up. For safety a space of at least .006 inch should exist between each of the posteriors. A convenient gauge for this space is a Gillette safety razor blade which is approximately .006 inch thick. I have examined a number of cases of breakage of posteriors under the microscope, and, in every case, the teeth were found to have been too tight together.

A test for possible tooth breakage after a case is boiled, foiled, and ready can be made by painting the patching cement on the cast foil over a portion of the cast that approximates the ridge lap of the teeth. Attach thin strips of carbon paper thereto and close the case. Any carbon marks on teeth and a slight portion of the teeth underneath the carbon marks should be ground away with mounted points. When carbon marks no longer result on teeth, clean with chloroform and proceed.

I have had some success in the recovery of hardened uncured material by placing it in a jar with new material and resealing.

145 *East Jefferson Street.*

Announcement of Books Received

AN INTRODUCTORY GUIDE TO BIOCHEMISTRY, By Sidney Bliss, Ph.D., Philadelphia and London, W. B. Saunders Company, 1939.

HISTOPATHOLOGY OF THE TEETH AND THEIR SURROUNDING STRUCTURES (Illustrated with 438 Engravings), By Rudolph Kronfeld, B.S., M.D., D.D.S., Second Edition, Revised, Philadelphia, Lea & Febiger, 1939.

COMPLETE DENTURE PROSTHESIS (583 Illustrated), By Rudolph O. Schlosser, D.D.S., Philadelphia and London, W. B. Saunders Company, 1939.

A Combined Electrolyzer (Ionization Apparatus) and Pulp Tester for Alternating Current Supply

LOUIS I. GROSSMAN, D.D.S. and A. L. CHARNY, E.E., Philadelphia

IN THE ELECTROLYZER for dental use which has been described by one of us[1] a 45 volt battery is employed under control of a potentiometer to supply the required current for electrosterilization. The present article describes a combined electrolyzer and pulp tester in which the power is obtained from the house current supply. The alternating current is first rectified; that is, converted into a unidirectional current, and the ripples in the current wave are smoothed by means of a suitable filter into an unvarying direct current. The control circuit used in the battery-type electrolyzer has been retained.

Rectification

The theory of rectification has been amply treated in standard textbooks. For purposes of this discussion, it will be sufficient to state that rectification of an alternating current will occur whenever there is connected into the circuit a device that has the property of transmitting electric current unequally in the two directions. A radio vacuum tube is such a device.

The vacuum tube when used as a rectifier has two useful elements: the anode and the cathode. The cathode is a filament of tungsten which is raised to a temperature sufficient to make it a source of electrons. An electron is a negative particle, and, if the anode is kept at a positive potential with respect to the cathode, the electrons will be attracted to it and a current will flow in the direction opposite to the motion of the electrons; that is, from anode to cathode. When the anode potential is reduced to zero or becomes negative, no current will flow.

Operation of Vacuum Tube Rectifier

A schematic diagram of the apparatus is shown in Fig. 1.

The transformer (T) reduces the house voltage to the filament voltage specified for the vacuum tube. At this voltage the filament is raised to the temperature at which electrons are most efficiently produced.

C_1 is the output condenser, the function of which is explained later.

L_1 and L_2 are smoothing chokes.

C_2 and C_3 are by-pass condensers to by-pass residual alternating currents.

Alternating current is generally delivered to the residential consumer at 110 volts and at a frequency of 60 cycles per second. After rectification by means of the vacuum tube alone, the negative portion of the wave is cut off and only the positive half remains. The effect of the input condenser C_1 is to smooth the humps in the current wave.

The function of the inductances L_1 and L_2 is to decrease the ripples in the load current.

The condensers C_2 and C_3 also perform the function of reducing the ripples but in a different manner: They are shunted across the circuit inasmuch as they offer a low impedance path to the direct current carrier.

The voltage available at the terminals is greater than that normally required for dental electrolysis. Advantage has been taken of this fact

[1] Grossman, L. I.: An Electrolyzer for Use in Electro-Sterilization, D. Cosmos, 71:708-710 (July) 1929.

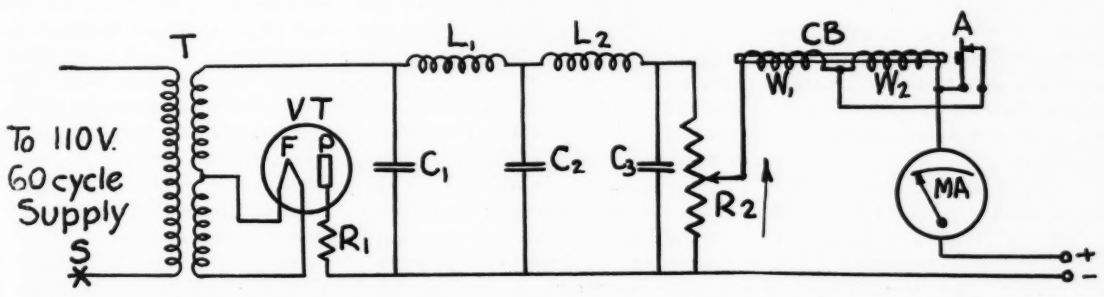


Fig. 1—Schematic diagram of combined electrolyzer and pulp tester. T: transformer; R_1 and R_2: resistance devices (R_1 is the relay; R_2 is the potentiometer); C_1, C_2, C_3: condensers; L_1 and L_2: smoothing chokes; CB: circuit breaker; W_1 and W_2: windings; MA: milliammeter: VT: vacuum tube in which F is the filament and P is the plate of the vacuum tube; S: switch.

to introduce into the rectifier circuit the resistance R_1, which acts as a current limiting device. The need for this will be realized when it is remembered that the vacuum tube is a negative resistance device: *its resistance decreases as the current through it increases.* If an accidental short circuit were to occur at R_2, the current would rise to a value sufficient to damage the tube or shock the patient. The insertion of the resistance R_1 limits the value of the current, so that a short circuit could be maintained for some time at R_2 without destroying the tube.

Control Circuit

The control circuit consists of potentiometer R_2, automatically reclosing circuit breaker CB, and milliammeter MA. By turning the potentiometer in the direction shown by the arrow, the current in the output circuit is increased. The circuit breaker has been included to protect the patient and apparatus from accidental short circuit. It operates as follows: If the current through the winding W_1 exceeds 10 milliamperes, the magnet is energized sufficiently to attract the armature, A. This breaks the contact and inserts winding W_2 into the circuit. This winding has a high resistance and its insertion at once reduces the current to a safe value, which is, however, sufficient to keep the magnet in operation. If the potentiometer is now turned back to zero, the circuit breaker is released and the circuit is ready to function again.

Practical Specifications

In the experimental electrolyzer constructed by us, specific ready-available pieces of commercial apparatus were used. The highest grade instruments obtainable were used in each case, because that was regarded as the most economical procedure in the long run.

The supply cord is fastened to a terminal block and is a rubber covered "garage" cord. The switch (S) is a sturdy toggle switch of 3 amperes rating. The transformer is shielded and supplies 6 volts filament voltage for the vacuum tube and 150 volts for the rectifier circuit. The tube is mounted in a standard socket as in a radio set. The resistance R_1 was empirically chosen at 10,000 ohms for use with the tube. It is a vitreous enameled resistance of 10 watts capacity. The condenser C_1 is a 4 microfarad condenser of 600 volts rating; C_2 and C_3 are 3 microfarad condensers of 400 volts rating. The inductances L_1 and L_2 each have a value of 20 henries.

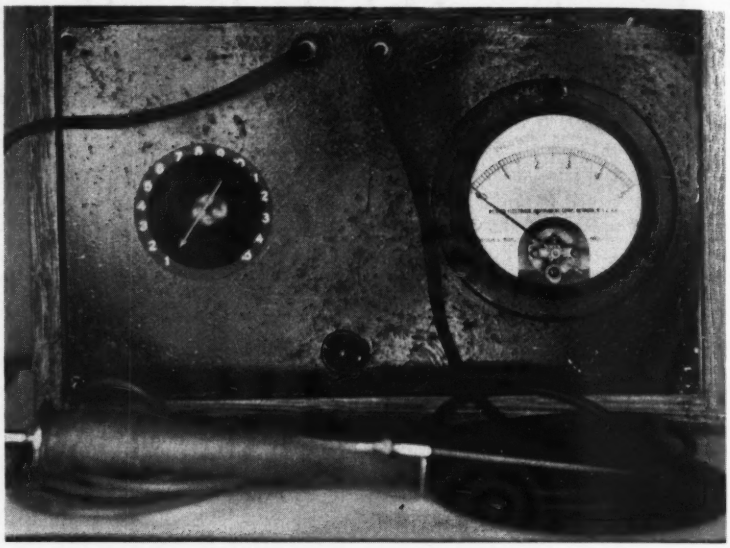


Fig. 2—Combined electrolyzer and pulp tester. Hand and tooth electrodes are shown in foreground.

The potentiometer R_2 should be carefully selected for durability and smooth operation. The one chosen by us is wire wound, has a total resistance of 50,000 ohms, and a rating of 10 watts capacity. The circuit breaker is a relay manufactured by Western Electric Company and requires adjustment to operate at the proper value of the current. The milliammeter is a Weston, number 301 meter, with a range of 0-5 milliammeters. The plus and minus terminals have been brought out to red and black binding posts respectively.

The apparatus is mounted as follows: The terminal block, transformer, vacuum tube socket, resistance, condensers, inductances and circuit breaker are mounted on a sub-base and the necessary leads are brought up to a panel that holds the switch, ammeter, potentiometer, and binding posts.

The apparatus is enclosed in a wooden box that has a partition lengthwise. This partition serves to make a compartment for the leads and the terminals. Holes have been drilled in this partition to ventilate the interior and carry off the heat developed by the vacuum tube.

Life of the Rectifier

The normal life of the tube as used in a rectifier is approximately 1000 hours. In the radio circuit in which it is commonly used, it delivers approximately 30 milliamperes, whereas in the electrolyzer, it does not need to deliver more than 5 milliamperes as a maximum. With the danger of accidental short circuits obviated by use of the circuit breaker already described, a life of more than 5000 hours can be reasonably expected. This should be sufficient for a lifetime usage. In case of accidental breakage, the tube can be readily replaced at a small cost without requiring the services of an expert. The paper condensers used at C_1, C_2 and C_3 deteriorate with age; however, by selecting condensers whose rating in terms of maximum safe voltage gives a high factor of safety as compared with 150 volts (the maximum to be handled). It is expected that no difficulty will be experienced.

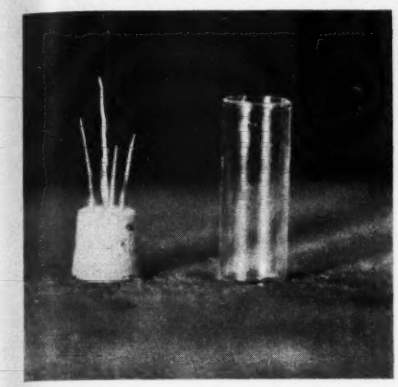


Fig. 3—Electrodes of various diameters and lengths shown mounted on base of cork stopper which fits into bottle at right.

The Rectifier as a Pulp Tester

Inherent in the circuit design of the rectifier is its action as a pulp tester. For effective pulp testing, it is necessary to interrupt a voltage of approximately 100 volts. This cannot be done with the ordinary electrolyzer inasmuch as it is operated by a battery having a maximum output of only 45 volts. In the rectifier, the maximum available voltage is approximately 150 volts, and this voltage, under control of the operator, can be varied in small steps from zero up to the maximum.

Operation of Electrolyzer

The operation of the electrolyzer is essentially the same as that described in previous articles[2]:

1. The platinum wire electrode is flamed, allowed to cool, then inserted in the root canal which has been previously flooded with a suitable electrolyte.

2. The potentiometer dial is turned back to zero, and the patient is given the metallic tube electrode to hold in the palm of the hand.

3. The switch is turned on and the potentiometer is slowly and gradually turned until the patient begins to feel a tingling sensation in the tooth.

4. When this occurs, the potentiometer is moved back slightly to diminish the current supply a trifle. The patient should feel no uncomfortable sensation.

The length of treatment is proportionate to the number of milliamperes tolerated by the patient, according to the formula $\frac{30=T}{m.a.}$ (in minutes). Thus, if the patient tolerates 2 m.a., the treatment is 15 minutes or, if 3 m.a. are tolerated, the treatment time is 10 minutes, and so on.

5. At the conclusion of the treatment, the current is slowly turned off by moving the potentiometer dial back to zero. The switch is turned off and the electrodes are removed.

Operation of Pulp Tester

One of two methods may be used for pulp testing:

First method: 1. The tooth or teeth to be tested are isolated by means of cotton rolls, then dried with compressed air.

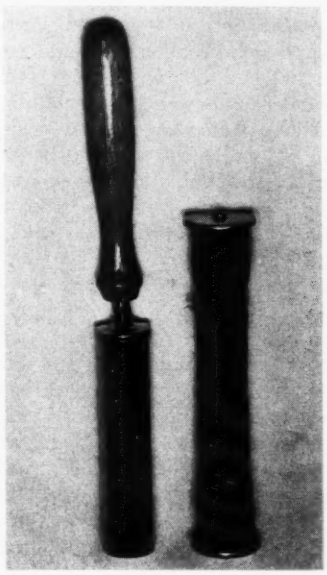


Fig. 4—Hand electrodes. A, metallic tube electrode. B, the author's electrode, the surface of which is wound with knitting wool. Electrode is soaked in water just before use, so that the surface will conform to the palm of the hand and insure good contact between the hand and electrode.

2. A bit of toothpaste, the size of a pinhead, is placed on the tooth to be tested. This acts as a conductor. It will not drip from the tooth as would salt water, but will remain localized wherever it is placed.

3. The platinum needle electrode is applied to the toothpaste on the tooth and is removed quickly so as to make and break contact.

4. The potentiometer is turned on in one-half unit stages, following the unit scale around the potentiometer dial, until a response is elicited from the tooth.

5. The unit number is noted and compared with the unit number at which response is obtained in a control tooth.

Second method: 1. Neither isolation nor drying of the tooth is required. On the contrary, the tooth to be tested is moistened with the tongue just before making the test so as to insure contact and conduction.

2. The platinum needle is applied to the tooth and removed quickly to make and break contact, during which time the current is turned on slowly in one-half unit stages.

3. When a response is obtained, the unit number on the scale is observed and compared with the unit number of current required to elicit a response from a control tooth.

Although the second method is somewhat simpler than the first, because it requires no special preparation of the tooth to be tested, it is not so accurate in such cases in which the saliva has had an opportunity to dry out during the test and thus to interfere with the conduction of the electric current. Also, there is some possibility that the current may at times be conducted to the gum tissue by the continuity of saliva over tooth and gums, thereby eliciting a response from the gums rather than from the tooth.

It might be well to draw attention to the fact that in electrosterilization, the milliammeter is the measuring stick, whereas in pulp testing this is disregarded and the arbitrary scale around the potentiometer is followed.

Medical Arts Building.

[2] Grossman, L. I.: Outline of Electro-Sterilization Technique, D. Cosmos 75:196 (February) 1933. Treatment of Periapical Infection by Conservative Methods, J. A. D. A. 21:1669-1674 (September) 1934. See also footnote 1.

Shoulderless Lingual Reinforced Jacket Crown

FRED R. FELCHER, D.D.S., Chicago

THE IDEAL PREPARATION for a jacket crown, as usually found in illustrations, but not often in practice, is a tooth with all the enamel denuded, a well-defined shoulder at the gingival, and the shoulder carried slightly below the gum margin. These preparations are not common because sound teeth are not often prepared for jacket crowns. The exception to this is frequently found when a slight retrusion or protusion of a tooth is corrected with a jacket crown. Most teeth requiring porcelain jacket crowns are broken down, having had restorations that failed through accidental breakages, or portions of the tooth destroyed through other causes. Preparation of the tooth for a crown necessitates additional tooth removal.

The strength of a porcelain jacket crown is not in the poreelain, but in the tooth itself, for the tooth or some supporting structure must protect the porcelain against directional forces. The accepted rule is that attritional strains must never be allowed to pass through porcelain if fractures, half-moon or otherwise, are to be prevented. Strains must be absorbed by the tooth.

Although bulk porcelain is hard, it is really not strong, as it has no perceptible yield. The idea that when a jacket fails it is necessary to remove more tooth in replacing the jacket so as to allow for more porcelain is incorrect. The object to be attained is to support the porcelain at the points of attritional stress, so that the strains will be absorbed into the tooth, and the forces will then be cushioned by the membranes that support the tooth. There are different methods by which this can be obtained; for instance, by the use of a gold core casting, to which a porcelain jacket crown is later fitted. This does not always prove advantageous because of the necessity of a wide shoulder, wide enough to accommodate the gold core as well as the porcelain, which means that a great deal of tooth structure must be removed. Another means of restoring lost tooth structure, angles, for instance, is by the use of an inlay and a porcelain jacket crown over the tooth. This article, however, will be confined to my method of reinforcing beneath porcelain when less tooth removal is necessary and greater strength may be had. The various reinforcing adapters to be mentioned are used also as strong abutments for reinforced bridges.

With the simplification of the technique there is little reason why anyone who is familiar with porcelain procedure cannot obtain good results. In porcelain jacket construction, strength and beauty are factors to consider. Minimum tooth removal is important.

The innovation in the technique discussed here is the use of certain types of platinum metals and combinations, and the use of certain ceramic auxiliaries as a ground coat and an opaque basic. The combination of special metals and ceramic bodies allows for a definite bond between the ground coat and the metals, and a balancing so that no cracks and checks are present to give trouble if ordinary care is exercised.

In an ordinary porcelain jacket crown there is danger of the jacket breaking where the destroyed tooth does not support porcelain against attritional forces, and a shoulderless lingual preparation would ordinarily be a handicap because the porcelain is too thin (Fig. 1). In the usual method, it would be necessary to cut a shoulder all around, and also to lock some metal for porcelain protection into the tooth where the tooth structure is lost. In my method the porcelain is protected by the reinforcing metals to which porcelain is later baked.

Technique

1. Fill in the lost tooth structure with a hard material, such as modeling compound or a base-plate material, which is melted to the die. This is done to eliminate unnecessary metal under the porcelain. The metal to be used is hard, and when the case is finished the modeling compound will be replaced with cement on the patient's tooth (Figs. 2 and 3).

2. A platinum matrix is made as shown in Fig. 4. The matrix extends beyond the shoulder on the labial, but is brought high toward the incisal on the lingual. This is done in order to obtain a snug fit of the metal to the tooth at the finish-line, the metal being fitted closer by having the matrix out of the way. The matrix is used only on those areas of the tooth where porcelain is to make contact, which means that the cement thickness will be the thickness of the platinum matrix, usually .001 mm.; .00075 platinum foil may be used if preferred.

In Fig. 5 the adapter is fitted to the tooth and built to, or slightly longer than the finish-line lingually. The adapter metal is .002 mm. thick and is hard. The adapter metal is made especially for this technique.

3. The method of making the adapter is the same as the making of any matrix of platinum, but because of the hardness, frequent annealing from time to time is necessary. The porcelain furnace is used at a temperature above 2300° F., so that the metal can be burnished easily. The metal is slightly lapped at the seam, the tinner's joint being eliminated. After adapting the metal, it is swaged. Undesirable wrinkles which may be present in any part of the metal, particularly that portion which may be exposed in the mouth, are easily burnished out, so that a smooth surface may be had. The adapter is made over the platinum matrix.

4. The platinum matrix is allowed to remain on the die until baking is to be done.

5. Cover the adapter with sticky wax, and remove from the die.

6. Invest; reinforce adapter with metal at approximately 3300° F.

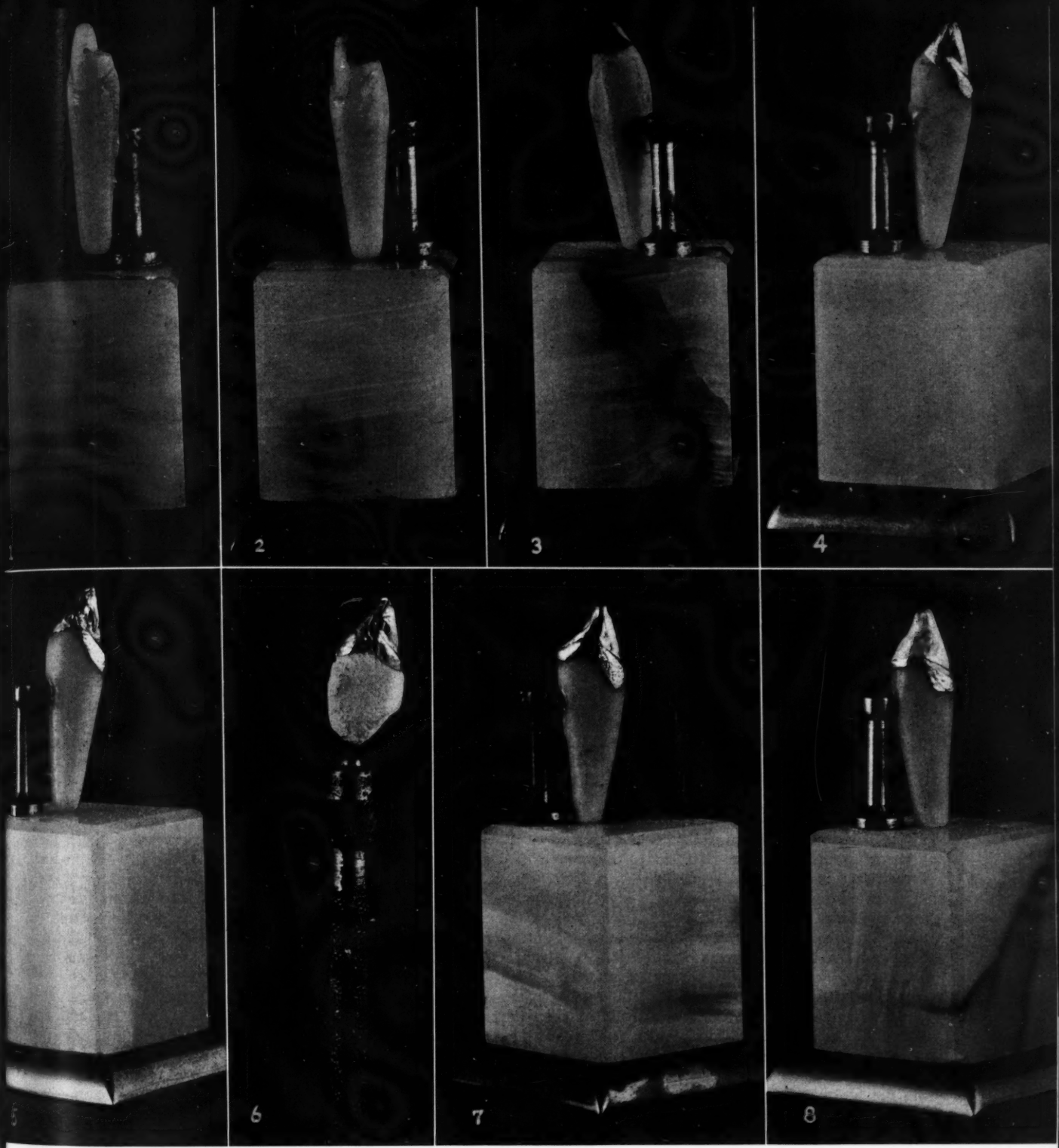


Fig. 1—Tooth prepared with only a labial shoulder, the lingual being left shoulderless. Note large amount of tooth structure lost at proximal.

Figs. 2 and 3—Modeling compound on tooth, used to fill in lost tooth structure.

Fig. 4—Platinum matrix extends beyond shoulder on labial but is brought high toward incisal on lingual. Complete matrix may be used if desired.

Fig. 5—Adapter fitted to tooth.

Fig. 6—Adapter properly exposed for brazing, and nail portion fitted into an old broach holder or pin vise.

Fig. 7—Adapter ready for porcelain.

Fig. 8—Ground coat baked to metal.

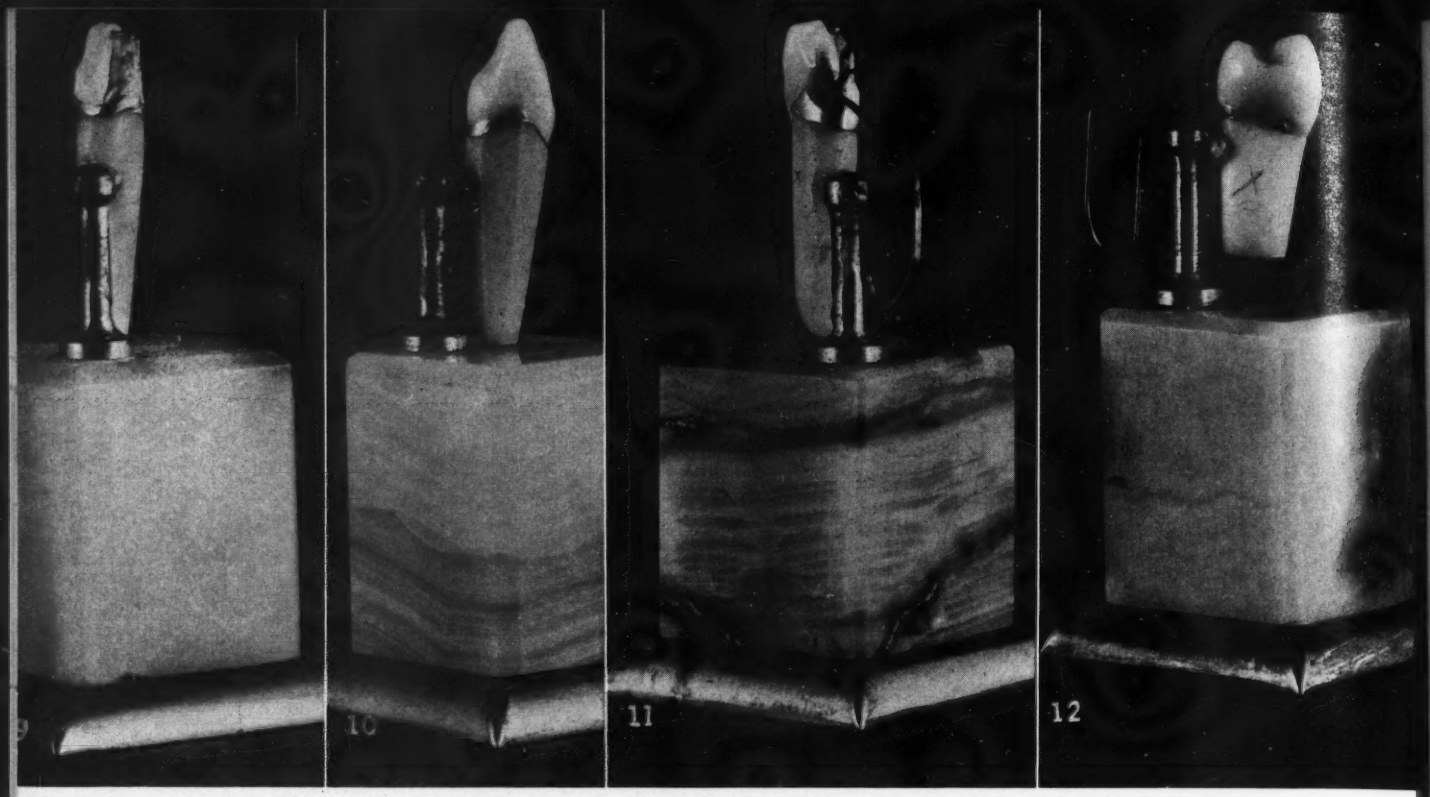


Fig. 9—Half of section of a basic mixture over ground coat.

Fig. 10—Finished crown.

Fig. 11—Finish-line high; lingual metal exposed; half view of crown.

Fig. 12—Lingual finish-line on bicuspid.

The investment is to play an important part. Platinum metals are easily contaminated by silicates and carbonates, and it is necessary that the refractories used be free of anything that will cause the platinum to become brittle. There must also be little or no change in the expansion or contraction of the material. The investment used has all the requirements needed. Fel-Por investment is used. It is mixed to a reasonably thick paste on the slab, then vibrated into the adapter with a small amount extending. Into this extended portion is placed a small nail or brad. Do not allow the nail to extend into the adapter proper; merely allow it to hold in the investment where it will not be in the line of high heat. To do otherwise would melt the nail and spoil the adapter.

7. As the investment has no setting qualities, do not expect it to set as a dental investment sets. Place the invested adapter on a piece of blotting paper; then, on the screen of a low-flame Bunsen burner. The slight heat will dry as well as set the investment. When set, burn off the wax and allow to cool. When cool, trim excess investment away freely to expose the adapter, then fit the nail portion into an old broach holder or pin vise (Fig. 6). Place this on a soldering block, bowl side up, with grooves on the rim for holding the broach holder.

8. Brazing is now done with "A" metal. This metal is not a solder but will, when the exact temperature is reached, melt and adhere to the adapter metal. "A" metal is cut into small pieces.

9. An oxygen and gas blowpipe with a number 2 or number 3 tip is used. The flame should not be too small, the cone being about one-half inch. Place a small piece of "A" metal where needed. Hold the blowpipe at right angles to the adapter, holding high at first until the adapter is hot. Gradually lower the flame, moving the blowpipe slightly from side to side or up and down as the piece of metal rests on the adapter. When the exact temperature is reached, the metal will drop to position. "A" metal will not spread or flow as a solder does. (Good goggles are essential.)

One must be careful not to burn the adapter metal, for there are only about 300 degrees' leeway between the two metals.

10. Build up with "A" metal as needed: build the finish-line; close the seam; build out for strength for a close-bite case (Fig. 11); build for any necessary requirements.

11. As soon as the brazing is completed the invested adapter is dropped while hot into clear hydrochloric acid; then washed and removed from the investment.

12. Dress the metal as required. It will be noted that "A" metal is hard. This is an important advantage.

13. Polishing of the exposed metal areas follows a slight roughening of the adapter. A rubber abrasive wheel answers the purpose.

14. Boil the matrix and the adapter in strong clean nitric acid. Wash; then place in the furnace to at least 2300° F. Remove and do not handle except with clean hands and as little as possible.

15. Ground coating is now done: A thin mix of ground coat porcelain,

mixed with distilled water, is applied with a small brush over the necessary parts of the adapter. Fire this to 2375° or 2400° F.

Mixing of Opaque Basic—The opaque basic is mixed in one of two ways:

A. One part of Fel-Por basic of the required color may be mixed with 3 parts of the gingival color of the high-fusing porcelain to be used. This is placed over the ground coat, then the area around the exposed metal is cut away. Fire to a medium biscuit bake. Remove and place under a glass. The ditched area is filled with the basic mixture before the high biscuit bake.

B. The preferred method is to build the crown or bridge with Fel-Por basic and the new Dentsply ceramic porcelain. This gives the method of building and firing with definite shade results.

In this method the ground coat is applied as usual. Mix 1 part of Fel-Por basic and 3 parts of Dentsply opaque. This is fired to 2400° F. The opaque mixture is of a higher temperature than the regular porcelain.

16. To make a reinforced jacket crown, shade 38 new Trubyte proceed as follows: After the application and firing of the ground coat, mix 1 part Fel-Por basic (blood orange) with 3 parts Dentsply ceramic opaque porcelain (blood orange). Apply over the ground coat. The lingual-gingival half is built to contour with the opaque basic mixture, the balance covered thin enough to protect against the discoloration effect of the metal. Fire this at 2400° and holding the temperature constant until a biscuit bake is had, showing that complete shrinkage has been attained. It is then ready for the dental porcelain.

Mixing Gingival Color—Mix the gingival color of Dentsply ceramic porcelain as follows: 1 part B, 1 part G, and 4 parts D. For incisal, use shade J. Build the body color as for the new Trubyte shading, placing the incisal where needed. The firing range of this porcelain is best obtained between 2325° and 2375° F. Bring to 2350° F. and hold until a medium biscuit bake is reached. Remove and place under glass. When cool, apply added porcelain, then again fire to 2350° F. and hold for a high biscuit bake. Remove and place under glass to cool. When cool, grind, dress the finish-line, polish, and proceed to finish the crown, baking to 2350° F. until fired. It is best to allow the finished crown to cool in the furnace.

Comment

Crowns may also be made with complete shoulder preparations if desired. Metal may fit the shoulder, or may be completely covered by porcelain. The flexibility of the technique permits many types.

25 *East Washington Street.*

EXAMINATION FOR APPOINTMENT IN THE DENTAL CORPS, REGULAR ARMY

An examination for the selection of candidates for appointment in the Dental Corps, Regular Army, will be held during the period August 7-12, 1939, both dates inclusive.

The examination, which will include both physical and professional examinations, the latter consisting of written, oral and clinical tests, is open to male citizens of the United States between the ages of 22 6/12 and 31 9/12 years at the time of the examination, who are graduates of acceptable dental schools and who have had at least 1 11/12 years subsequent practice in their profession.

Candidates who have failed more than one previous examination for appointment in the Dental Corps, Regular Army, will not be permitted to undergo examination again.

Full information and application blanks will be furnished upon request to The Adjutant General, War Department, Washington, D. C. Applications will not be considered after July 22, 1939.

Fixed Bridges Cast in One Piece

WALTER C. SHULL, D.D.S., Kansas City, Missouri

THE WORD "FIXED" is defined in the dictionary as: firm, lasting, permanent, stable. When dentists attempt to build a "fixed" bridge, then, they are undertaking a considerable task. To build a bridge that will even approximate the meaning of this word, calls for the exercise of judgment, attention to fundamentals, and strict adherence to detail.

For a replacement known as a "fixed" bridge the teeth used as abutments should have roots that are sufficiently long and there should be enough periodontal membrane attached in healthy alveolar bone to withstand the forces to which the abutments will be subjected. Not less than half of the original length should be attached. The tipped tooth should be used as an abutment only under unusual circumstances, although there are instances in which a tipped tooth has given long and useful service, such as in cases in which the anterior abutment was a strong healthy tooth in normal relation to the remaining teeth.

The ideal bridge, according to Stanley D. Tylman[1] of Chicago, consists of three teeth; that is, two abutments and one pontic, although many bridges of two abutments and two pontics are used. Doctor Tylman says that the cuspid-to-molar bridge is not unusual and the cuspid-to-cuspid bridge is not contra-indicated if "the abutment teeth are physically and biologically acceptable."

Technique

1. Determine the most suitable type of attachment for abutment teeth.

2. The abutment teeth are prepared and individual modeling compound impressions taken of them. Modeling compound impressions require great care. Many believe that the indirect method is, in their hands, more accurate, but inaccurate impressions result by this method. Impressions should be taken without involving undercuts. A modeling compound impression that is difficult to withdraw will often prove to be inaccurate. Modeling compound impressions should not be chilled but allowed to cool before removal.

3. The impressions are boxed with sheet wax or else root formers are attached to them and models are made with copper amalgam.

4. After these impressions are separated the root surfaces are examined to make sure that they are so shaped as to permit their removal from the stone cast to be poured about them later.

5. A transfer piece is made for each abutment. These are made as E. E. Bailey[2] of Denver describes in his article on bite coordination:

(a) Wrap a piece of stiff paper around the amalgam model as a matrix and hold in position with a finger.

(b) Melt a low-fusing metal, pour into model, and force to position by placing a finger over the metal.

(c) Remove when cool (this cools rapidly) and try on tooth.

(d) It is easier for me in making these transfer pieces to adapt 60-gauge tin foil to the model—for inlays, three-quarter, or full crowns—trim the foil to the margins, then melt the low-fusing metal, and apply to the foil with a spatula. This metal works almost like a wax, and the transfer piece can be made in a few minutes.

(e) In making a transfer piece for an inlay model, have the foil cover the entire occlusal surface, and build the low-fusing metal above it to a flat surface.

(f) All transfer pieces for molars and bicuspids are built flat across the occlusal, to aid in seating them in the impression.

(g) If the casting method is preferred, and a casting is removed with difficulty, do not force it off, but flow it off with boiling water; then paint the angles in the model with whiting, and make another casting. Forcing the casting off is apt to fracture the model.

(h) All grinding of transfer pieces should be done off the model so as to prevent scarifying the model.

(i) The transfer pieces are cemented to the teeth with carbo-eugenol and zinc oxide as a precautionary measure to prevent their moving during the impression taking.

These transfer pieces are made as Doctor Bailey demonstrated about six years ago.

6. A plaster impression is made of the section involved, and an impression is made of the opposing teeth.

7. A bite registration is taken.

8. The shade of the facings to be used is chosen and recorded.

The teeth are now protected and the patient is dismissed.

9. The plaster impression is examined to make sure that the transfer pieces are in their proper places. The models of the abutment teeth are put into the impression, being seated into the transfer pieces. Caution: If the model does not seem to go to place easily, trim the impression, being careful that no plaster pieces remain in the impression, and try the model again. Be certain that the models are in their positive positions.

10. Tack the models in place with sticky wax.

11. Pour the impression with a good stone material. The impression of the opposing teeth is also poured.

12. When the casts are separated the case is mounted on an articulator.

13. At this point, according to Doctor Bailey's procedure, check to see whether the pattern will withdraw when completed.

14. Place the transfer pieces in position on the cast, and join them with a bar either by heating the bar until it buries itself into the metal or by attaching it with sticky wax, thus forming an improvised bridge.

15. Withdraw the joined transfer pieces; carry them to the mouth, and

[1]Tylman, S. D.: Essential Factors in Fixed Bridgework, J. A. D. A. 20:587 (April) 1933.

[2]Bailey, E. E.: Occlusal Reconstruction and Bite Coordination. J. A. D. A. 19:1810 (December) 1932.

check in the mouth for accuracy.

16. Proceed if the joined transfer pieces can be withdrawn from the cast, and from the teeth.

The pouring of the cast and these tests may be made, if preferred, at the time the impression is taken. This eliminates one sitting.

17. Remove the models from their sockets in the cast, and make the wax patterns for the abutments at least approximately as the finished product is to be. This is done to insure accuracy in choosing the facings.

18. Then select a facing and build porcelain tips. If tru-pontics are used, grind them to their proper position, and glaze.

19. The wax pattern for the bridge is now prepared. Either refine the wax patterns of the abutments or build new ones, being certain that they will remove easily.

20. The facings are placed in position and tacked lightly to the cast with sticky wax.

21. Oil the buccal or labial surface of the abutments, facings, and cast, and pour a plaster matrix. As soon as this matrix hardens, remove it.

22. The wax pattern is now made for each facing separately, holding the facing in position with the matrix. Refine these as they are completed; that is, see that they are carved as necessary, that they are smooth, and that the facing removes easily from the pattern.

23. When completed, the pieces are ready to be joined. Oil the matrix; see that the abutment patterns are in place; put the matrix in position; place the pontics in the matrix, and flow a little hot inlay wax between the parts. Fasten all but one joint, usually the middle one; then allow to cool to room temperature before joining the last one. It is well to hold the abutment patterns lightly in place until the wax cools.

24. All patterns are built at room temperature, and if chilled at all, are chilled in water of thermometer-registered room temperature. Any pattern should be invested as soon as it is completed. This prevents any change in the wax pattern resulting from change in temperature or from curing of the wax.

25. Inspect the pattern to see that it has not pulled away from the models, and sprue the case. If the bridge is small, up to three teeth, I sprue it near the middle, using about a 13-gauge sprue-former. If it is longer, I usually sprue it at one end. In case the pattern contains a full crown, it is best to place the sprue on it. The cast can be trimmed to aid in placing the sprue. Always sprue the case before removing it from the cast, being certain that the sprue is well fastened to the pattern.

26. If the facings are not saddle-type, they are removed before the pattern is removed from the cast. An-

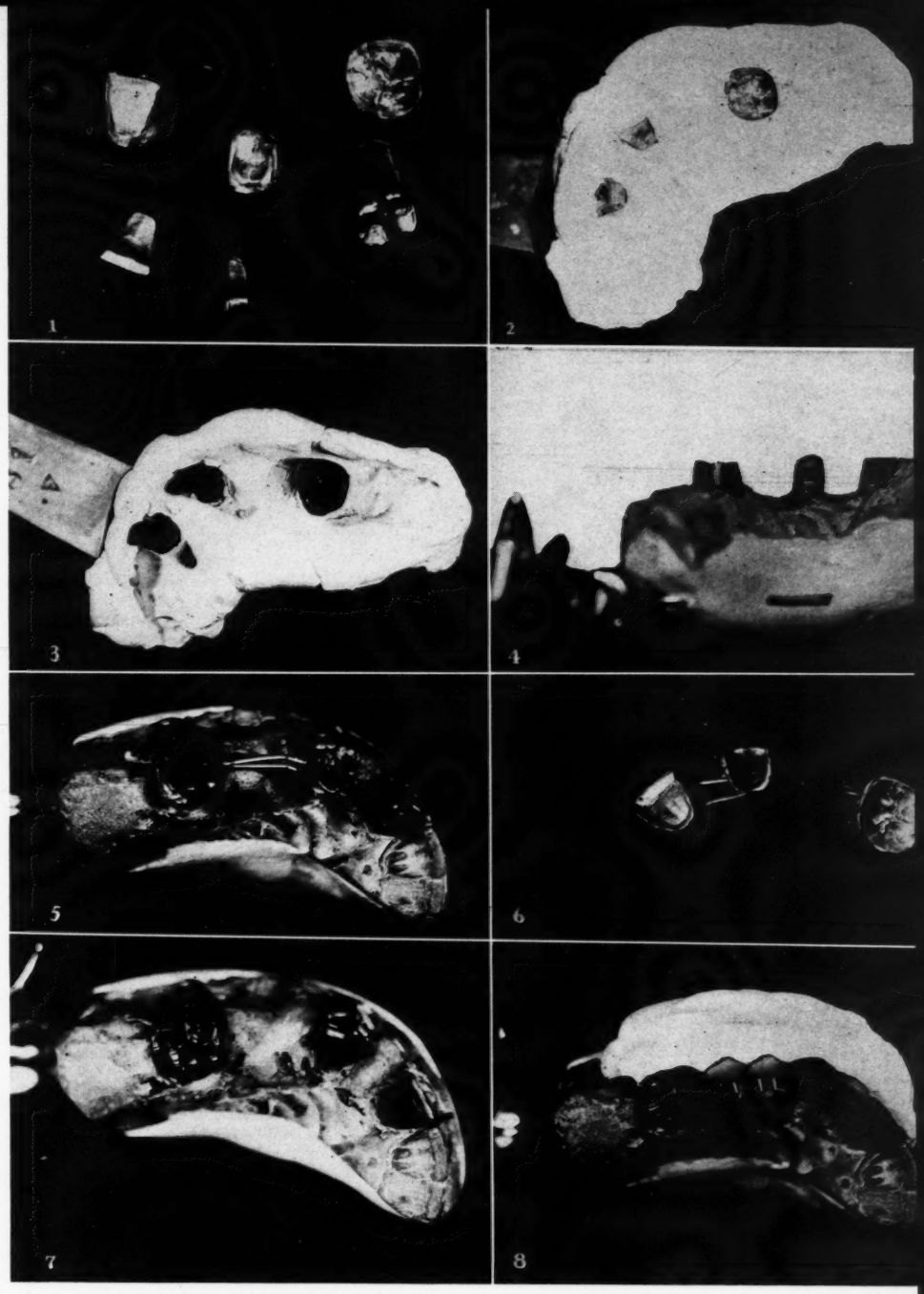


Fig. 1—Amalgam dies; transfer pieces.
Fig. 2—Plaster impression with transfer piece in place.
Fig. 3—Plaster impression with amalgam dies placed into transfer pieces.
Fig. 4—Model with amalgam dies in place.
Fig. 5—Transfer pieces wired together for testing in mouth.
Fig. 6—Transfer pieces fastened together for testing in mouth.
Fig. 7—Wax patterns in place on model.
Fig. 8—Wax patterns in place; facings in place, and plaster matrix poured.

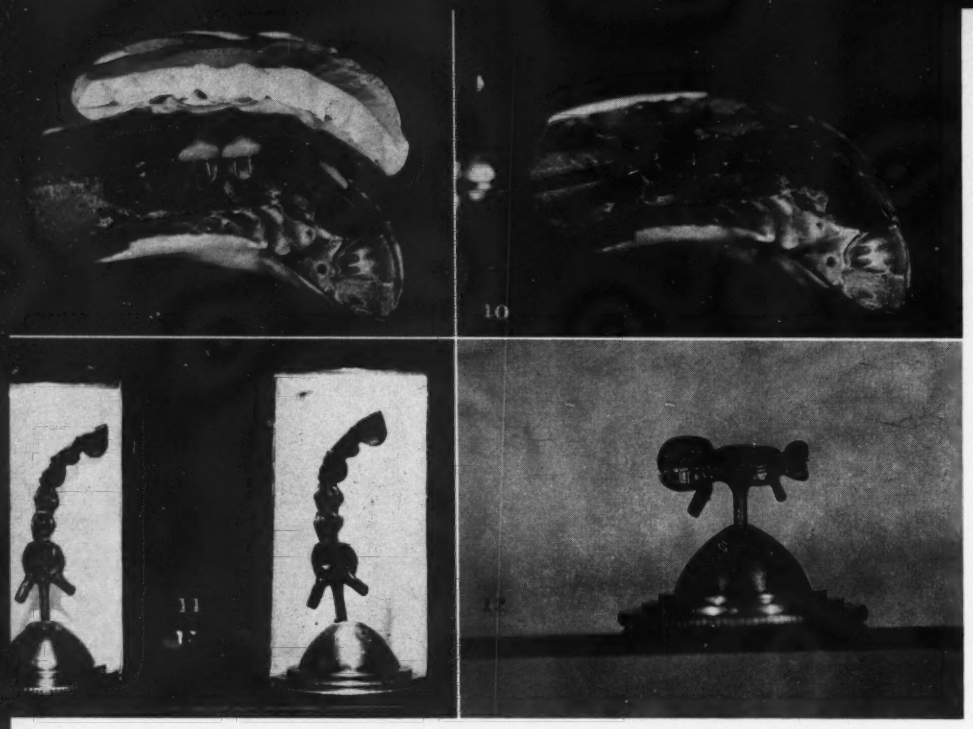


Fig. 9—Matrix removed.
Fig. 10—Facings removed; pattern sprued and ready for removal.
Fig. 11—Testing wax pattern for position in ring before investing.
Fig. 12—Sprueing small bridge.

other inspection is made of the pattern; if it fits at all points, it is gently teased from the cast.

27. The pattern is mounted on a sprue-former, and tested for position in the casting ring. If there is a curve in the pattern which will throw the pattern against or too near the ring, I use a sprue-former that has been ground where the sprue fits, and this space is filled with wax. This permits the sprue to be set at an angle, throwing the pattern away from the ring.

28. In removing the sprue-former thus used, heat until the wax holding the sprue is softened to prevent breaking investment in its removal.

29. The pattern is washed with wax cleaner, using a soft camel's hair brush; then rinsed in room temperature water, and dried with a chip blower. A delicate wax pattern should not be dried with a heavy blast of air. The pattern is now dusted with investment powder and the powder blown off of it.

30. Invest:

(a) Line the selected casting ring with asbestos, and moisten the asbestos. If using a long ring for the larger cases, it is best not to use two strips of asbestos to line the casting ring but to procure some sheet asbestos and cut strips that will line the ring. In using two strips the asbestos may pull away from the side of the ring and be forced against the pattern by the investment.

(b) The plaster bowl is washed and dried lightly. This is done so that the bowl will be moist and not absorb any of the water used for the mixing with powder.

(c) For investing a small pattern use 16 cc. of water, and 40 Gm. of powder. Cristobalite inlay investment is used in casting. If investing a larger case, I have to make two mixes, the first containing 24 cc. of water and 60 Gm. of powder. The second mix is the same as the smaller amount given: 16 cc. to 40 Gm.

(d) Distilled water is measured and put into the bowl, then the powder is added.

(e) Incorporate water and powder with a hand spatula, then spatulate with a mechanical spatulator for 30 seconds.

(f) When spatulation is completed the mix is vibrated on a vibrator; the pattern is carefully painted with the mixture, and vibrated lightly with a hand vibrator.

(g) The casting ring is placed on the sprue-former, the mixture poured into it, and the case again vibrated with the hand instrument, just enough to cause the mixture to flow about the pattern.

(h) The case is left to set for at least 40 minutes.

31. The ring is placed into an electric oven. The oven I use is turned on low heat for 20 minutes; then on medium heat for about 30 minutes, on high, for 15 minutes; a cover is placed on the oven, and in 15 or 20 minutes the case is hot enough to cast; however, do not go by the clock for burning out, but judge by the color of the investment and whether there is any odor of the burning wax left. The oven should not be entirely closed until the wax is eliminated. The case is cast when a red glow can be seen in the sprue-hole.

32. The case is opened after it cools a little, and the casting is cleaned and pickled. This is done by boiling the casting in a test tube of hydrochloric acid. I believe it is a mistake to heat and drop any casting into acid. I am of the opinion that many castings are warped in this method of pickling.

33. The casting is inspected for bubbles (which do not occur so frequently any more); these bubbles are removed.

34. The casting is tried on the cast.

35. Finishing is done as for any other bridge.

36. The facings are not cemented until the bridge has been tried in the mouth and the occlusion has been found satisfactory.

Advantages

Why a cast bridge? I believe time can be saved by this method because only one casting needs to be made. The possibility of faulty solder joints is eliminated and I believe that stresses are eliminated. Compensating for gold shrinkage makes it possible for the bridge to rest on and in the teeth without strain. I believe that many three-quarter and inlay attachments fail because there is a small amount of stress in the bridge, and one attachment or the other has to be held in place while the cement sets. Any three-quarter attachment that is set under stress will fail. I feel confident that the method described here will give satisfying results, especially in small bridges.

Brookside Boulevard at Sixty-Third St.

The Editor's Page

C-E. A. WINSLOW of Yale University addressed the general session of the Illinois State Dental Society meeting in Peoria on May tenth. Doctor Winslow is an eminent public health administrator, but like most of his colleagues, he does not emphasize how dentistry differs from medicine in any scheme to supply health care to all the people. It is hardly possible for any system of compulsory insurance to operate in any field in which more than 90 per cent of the premium payers are constant beneficiaries. The incidence of pneumonia, tuberculosis, cancer, heart disease, and other general diseases is comparatively low, so that the group can band together and protect itself by a form of health insurance, because only a few of the group will need to claim benefits. In the case of dentistry, however, virtually every premium payer will demand the service, so that the premium must approximate what each person would pay if he had to buy separately and independently. Thus there is no saving or advantage in adopting the insurance principle in a situation of this kind.

Michael M. Davis is neither a dentist nor a physician; nevertheless for a decade or more, he has spoken as a medical economist. When he was with the Rosenwald Foundation and tried to establish a dental clinic in Chicago, the project was vociferously voted down by Chicago dentists. (Mr. Rosenwald, in common with other philanthropists, did not build his huge fortune in an altruistic enterprise, but in the mail order business.) Recently Mr. Davis has migrated to New York to become the chairman of the Committee on Research in Medical Economics. In that capacity, Mr. Davis has been speaking on the subject of reducing the cost of dental care.[1] First he criticizes the statistical study made by the Chicago Dental Society, under the direction of a highly qualified economist, Peter T. Swanish, Ph.D., which shows the cost of dental care to be $50 per person if the average adult mouth is to be put in healthful condition. Mr. Davis asserts that "the facts of this study have been challenged by reputable authority as exaggerated," but he neglects to say who the "reputable authority" is; he fails to say why the study is incorrect; he does not analyze the data.

Mr. Davis suggests the following as a project for the dental profession: "The dental profession should set for itself with the cooperation of public and private agencies, the task of furnishing 50 per cent additional service with the present number of dentists, and at the same time of reducing the unit cost of service by at least 30 per cent." Let us sharpen our pencils now and examine Mr. Davis's plan of 50 per cent more service at 30 per cent less cost. Here is a hypothetical dentist who serves a thousand people who spend an average of $6.00 a year each for dental care. The gross income from such a practice is $6000 a year. If the expense item is 40 per cent, as it usually is in dental practice, this dentist has a net income of $3600, which, it should be mentioned, is $700 a year more than the actual average income of dentists. (United States Department of Commerce[2]). Now suppose that this dentist increases his clientèle by 50 per cent and instead of serving a thousand people, he serves 1500 who spend, not $6.00 a year average each but 30 per cent of $6.00 or $4.20. The gross proceeds from such a practice would be $6300 and the net would be $3780. This assumes that the fixed and overhead expense in both practices is held at a constant of 40 per cent.

What do we find? A dentist by working longer hours, 50 per cent longer, under a 30 per cent decreased fee schedule, would have a net profit at the end of the year in excess of what he would ordinarily have of $180 or a profit of $15 additional a month. This would be a dentist's return for his increased hours of drudgery, for his mounting nervous exhaustion, for the tribulations that would come from meeting 50 per cent more of the public.

We are all agreed that it would be fine if 50 per cent more people could receive dental care but it cannot be successfully done under a system in which dentists are paid 30 per cent less than they now receive while caring for 50 per cent more people. When it is considered that the average net earnings of dentists are under $3000 a year; that their productive years are comparatively short, and that from these earnings they must buy all their own social security and life protection—can it still be thought the dentists' responsibility to meet the dental needs of the nation at the sacrifice suggested by Mr. Davis?

[1] Davis, M. M.: Reducing the Costs of Dental Care, New York J. Dent. 9:194 (May) 1939.

[2] Lasken, Herman: Incomes of Dentists and Osteopathic Physicians, U. S. Dept. Commerce, Survey of Current Business, April, 1939.

Bacteriology of the Dental Handpiece

CLAUDE E. ZoBELL, PH.D., CLYDE McMORROW, A.B. and ELMA MORRIS, Madison, Wisconsin

PROGRESS HAS CERTAINLY been made in recent years in the application of asepsis to the practice of dentistry. The average modern dentist is as germ-conscious as is the physician. He exercises most known practical precautions to safeguard the health and well-being of his patients. Little attention, however, has been devoted to the dental handpiece together with its intricate accessory equipment as a potential source of infection.[1] Our attention was drawn to this program as an outgrowth of our interest in the bacteriology and epidemiology of Vincent's infection,[2] cases of which have allegedly been contracted in dentists' offices. This article is a summary of a survey made of the care of the dental handpiece in practice and the results of the bacteriologic tests of handpieces.

Method of Survey and Examination

Working in pairs or alone, we visited the offices of more than fifty dentists to obtain first-hand information on their methods of caring for the dental handpiece. Most of the dentists were cooperative, permitting us to observe, answering questions freely, and assisting us to collect material for bacteriologic examination.

Exterior of Handpiece—The majority of the dentists admittedly made no attempt to disinfect the handle (exterior) of the dental handpiece. It was cleaned only as often as its physical appearance demanded such treatment. Even esthetically this practice may be subject to criticism inasmuch as the fingers of the operator in many instances moved alternately from the handpiece into the patient's mouth and back again, often carrying with them saliva and other buccal exudates.

The direct microscopic examination of material scraped from the handle revealed the presence of an abundant bacterial flora characteristic of the oral cavity as well as fragments of desquamated epithelial cells, erythrocytes, and occasional leukocytes. The viability of many of these bacteria was demonstrated by inoculating nutrient agar plates. In view of the fact that the material on the outside of the handpiece is subject to considerable desiccation and other conditions unfavorable to the prolonged survival of delicate pathogens, such as those that cause Vincent's infection, it is doubtful whether the exterior of the handpiece is important as an intermediary in the transmission of infection; nevertheless the danger from this source could be further minimized and the esthetics improved if the exterior of the handpiece were wiped with a piece of cotton or gauze moistened with a germicidal cleansing solution after treating each patient.

Interior of Handpiece—The internal working mechanism of the handpiece is somewhat more menacing, particularly when it is used directly, without the use of an angle extension. The centrifugal force exerted by the rapidly rotating spindle tends to suck the barrel full of any fluid material with which the chuck of the handpiece comes into contact. When the dental engine stops, some of this material oozes out and may contaminate sterile drills, brushes or buffers; thereby the bacteria inconspicuously find their way into the mouths of other patients.

Only a few more than half of the dentists visited were attempting to obviate this potential source of cross-infection by treating the straight handpiece in various ways. Some used certain proprietary disinfectants; others used disinfecting solutions of their own concoction. The absolute efficacy of these procedures is questionable and was subjected to further study, but it is believed that any conscientious effort to cleanse or disinfect the handpiece will lessen the danger of cross-infection from this source.

Immediately after a handpiece was used in a patient's mouth, as many as 4,400,000 viable bacteria were obtained from a single handpiece by immersing it in sterile enrichment broth with the dental engine running alternately at high and low speed for one minute. Appropriate dilutions of this broth were plated out on nutrient agar. The microscopic examination of stained smears of the bacterial colonies that developed on the nutrient agar indicated that most of the bacteria were probably saprophytes, typical of the normal mouth microflora. The direct microscopic examination of material exuding from the ends of certain handpieces after use or that obtained by swabbing the detached spindles showed the presence of numerous bacteria, including staphylococci, streptococci, spirilla, spirochetes, and an assortment of bacilli of various shapes and sizes.

Similar results were obtained with contra-angle handpieces and right-angle handpieces. From one contra-angle handpiece recently used in a mouth-hygiene case 8,200,000 viable bacteria were demonstrated by immersing the handpiece in broth and then within a few minutes plating appropriate dilutions of the broth on nutrient agar. Table 1 summarizes the number of bacteria recovered

TABLE 1—*Number of Viable Bacteria Recovered from Handpieces After Use in Patients' Mouths: Indicated by Number of Colonies Developed on Nutrient Agar.*

Type of Handpiece	Handpieces Tested	Number of Viable Bacteria		
		Maximum	Minimum	Average
Straight	8	4,400,000	9,000	624,560
Contra-angle	12	8,200,000	7,200	1,629,410
Right-angle	10	7,100,000	55,000	1,980,220

[1] Bimrose, F. H.: Maintaining Sterility of the Dental Handpiece, DENTAL DIGEST 45:74 (February) 1939.
[2] ZoBell, C. E.: The Bacteriologic Diagnosis of Vincent's Infection, J. Calif. D. A. 4:1594, 1937.

from different types of handpieces as indicated by the number of colonies that developed on nutrient agar.

The higher bacterial counts associated with the right-angle and contra-angle handpieces are attributed to their more intimate contact with oral secretions and their more intricate mechanisms.

No relationships were noted between the hygienic practices of the dentists and the number of bacteria recovered from the handpieces. The number of bacteria seems to be directly related to the hygienic condition of the patient's mouth and the purpose for which the handpiece was used. Thus a contra-angle handpiece used in conjunction with the treatment of an acute Vincent's infection was loaded with mucus, blood, and bacteria, whereas one used by the same dentist to drill in preparation for a gold foil restoration was contaminated with only a few thousand bacteria.

Extension Angles—Virtually all the dentists observed in the course of the survey did attempt to sterilize their extension angles. Boiling water, steam pressure, chemical solutions, or combinations of these agents were in use. Only varying degrees of success were achieved as indicated by the bacteriologic examination of the instruments. Although some of the extension angles showed large microbial populations, most of the surviving organisms were resistant spore-formers and fungi which are of questionable septic significance. The handpieces and extension angles that had been processed in autoclaves and then handled aseptically were actually sterile. Others that had been treated in certain cleansing and lubricating solutions were relatively free of contamination.

Test of a Disinfecting, Lubricating Oil—One disinfecting, lubricating-oil preparation[3] was extensively tested to ascertain its germicidal efficacy in actual practice. Immediately after use of the handpieces in the patients' mouths the bacteria were swabbed from approximately one half of the outside part of the handpieces and from as much of the inside mechanism as could be exposed. Moist cotton swabs on the ends of glass rods carried in sterile test tubes were used for this purpose. Then each handpiece was immersed in the oil mixture for fifteen seconds with the dental engine running. After draining off the excess oil the other half of the handpiece was swabbed. The bacteria were washed from the swabs in enrichment broth and appropriate dilutions of the latter were plated on nutrient agar. The bacterial colonies that developed on the agar plates were counted after four days' incubation at 37° C. The results are presented in Table 2.

A second series of handpieces were examined by immersing them first in broth as before, followed by immersion (with the engine running in all cases) in the oil and then in a second tube of broth. That the first immersion in broth did not mechanically remove many of the bacteria was demonstrated by immersing the handpiece alternately in a second and third tube of broth without treating it with the oil. An analysis of the broth showed only a slight diminution in the number of bacteria in the second and third tubes. Following immersion in the oil mixture for fifteen seconds there was a marked decrease in the number of bacteria found in the second tube of broth. The data are summarized in Table 3.

Although in some cases viable bacteria were not recovered from handpieces immersed in the germicidal oil for only fifteen seconds, it is not to be construed that the oil reaches and kills all bacteria in this short period of time. Actually the germicidal ingredients continue to be in contact with the bacteria after the handpiece is removed from the oil, because the handpiece is filled with the oil; moreover, enough of the germicide may adhere to bacteria to exert a bacteriostatic action in the nutrient media, thereby preventing colony formation; however, such conditions would similarly obtain in practice, so that the testing procedures are believed to be representative.

TABLE 2—*Number of Viable Bacteria Demonstrated by Swabbing Alternate Halves of Handpieces Immediately after Use in Patients' Mouths and also after Treatment for 15 Seconds in a Germicidal Lubricating Oil.*[3]

Type of Handpiece	Number of Tests	Before Treatment Average	After Treatment		
			Average	Maximum	Minimum
Straight	6	592,000	368	2,320	0
Contra-angle	6	807,000	2,194	6,000	210
Right-angle	8	1,443,000	3,078	18,000	2

Comment

From the foregoing tables, it will be observed that a properly applied solvent oil containing suitable germicides may reduce the viable bacterial population of dental handpieces more than 99 per cent. Further experiments revealed that part of this reduction in bacterial numbers was due to mechanical cleansing or flushing action of the solvent oil by using the same formula without germicides. Under these conditions when the handpiece was turned on in the solvent oil for a few seconds the bacterial population was materially reduced and the oil itself shortly became dirty. Numerous bacteria were found in the sediment thus flushed from handpieces.

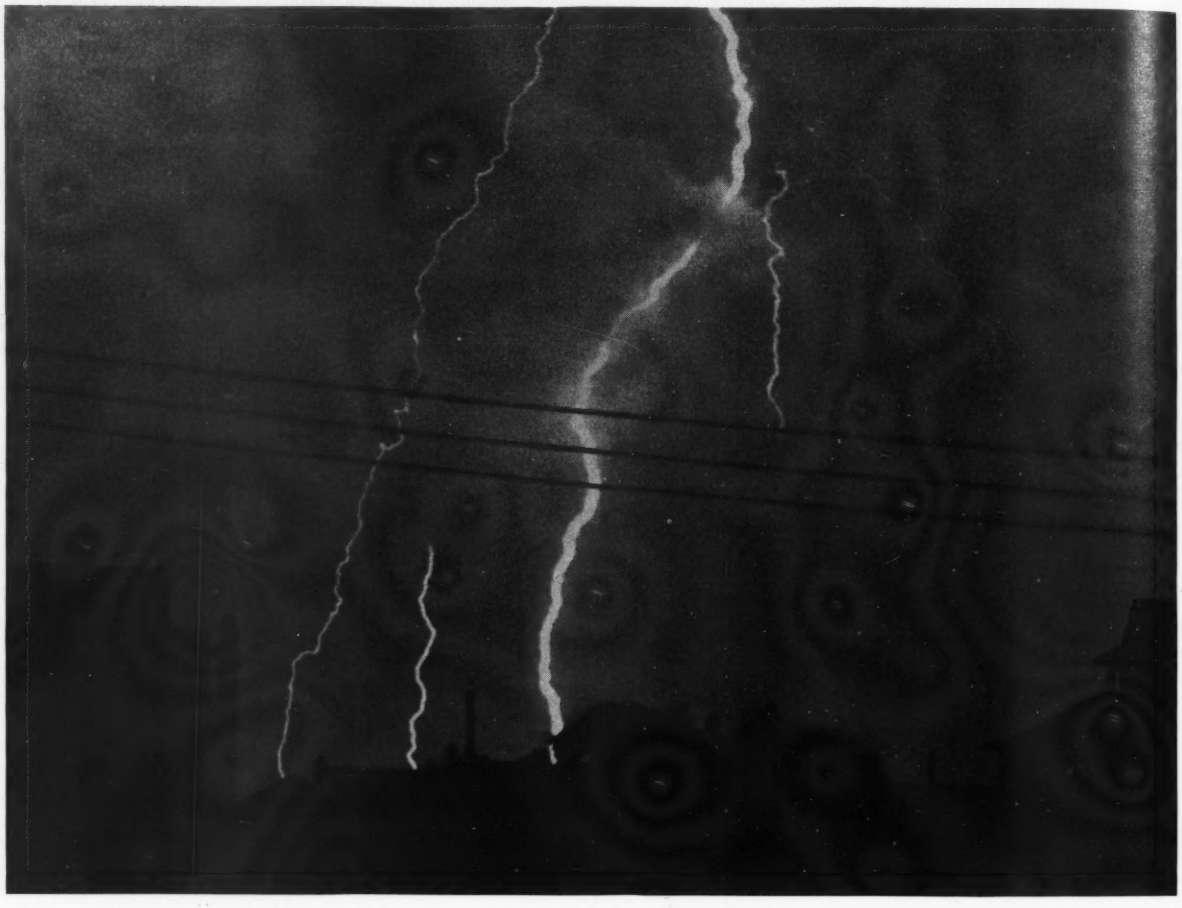
University of Wisconsin, College of Agriculture.

TABLE 3—*Number of Viable Bacteria Recovered from Handpieces Immediately After Use, Before and After Treatment with Germicidal Oil.*[3]

Type of Handpiece	Number of Tests	Before Treatment Average	After Treatment		
			Average	Maximum	Minimum
Straight	7	1,215,000	34	72	0
Contra-angle	4	2,904,000	109	241	0
Right-angle	6	2,385,000	67	200	0

[3] The oil preparation referred to in this article as "germicidal" or "disinfecting" is believed by the authors to be indeed germicidal, although it may function in other ways. Such treatment is recommended, however, for the sterilization of the dental handpiece as the ultimate in efficiency only with extreme reserve until further investigation is made. The authors suggest that the method appears promising but cannot yet say that the tested preparations are 100 per cent effective as germicides. The data indicate a marked reduction in the bacterial count.

Should Lightning Strike, Would You Be Protected?



A WELL-KNOWN DENTIST, in a recent article in an authoritative dental journal, said: "Unquestionably, the most important legal aspect of the dental roentgenogram is that it constitutes in itself invaluable malpractice insurance . . . Some may think there is little danger of malpractice suits for the dentist at large, but 'no one knows where lightning will strike.' During periods of unsettled economic conditions, such actions multiply . . . " It was further stated that: "The court may hold a dentist is negligent not only in not making roentgenograms, but also in not having x-ray apparatus readily available . . . Today, the courts are rendering verdicts against dentists for failure to own and use x-ray apparatus."

Here—another important reason for owning your own CDX. From its daily use both you and your patients will benefit. Patients appreciate a complete diagnosis. They agree readily to the need for added service when they see CDX-evidence; they can be sure nothing has been overlooked.

Flexible as your dental engine, it's easy-to-operate. A proved practice-builder, it's easy-to-own. And you can depend upon your CDX to produce routinely results of excellent diagnostic quality. Before investing in any x-ray unit, protect your investment! Do as thousands of your progressive, value-wise colleagues did: Get full facts about the CDX.

Take this easy step toward enjoying the added professional and financial benefits that owning your own CDX will bring. Sign and mail the coupon, today.

WITHOUT OBLIGATION

H 46

GENERAL ELECTRIC
X-RAY CORPORATION
2012 JACKSON BLVD. CHICAGO, ILL., U. S. A.

Send me complete information about the CDX together with prices and data about your easy payment plan.

Name .....

Address .....

.....

(*Or please use coupon on page* 254)

Calcium

. . . particularly important during childhood

SINCE calcium, phosphorus and Vitamin D are essential in the development of sound teeth, it is important that these elements be provided.

When the diet does not supply an adequate amount of calcium, the use of a dietary supplement containing this element is advisable. Dicalcium Phosphate Compound with Viosterol presents a readily absorbed and suitably balanced source of calcium and phosphorus, with sufficient Vitamin D to assist in their adequate utilization. It is available in tablet and capsule form. The tablets are flavored with wintergreen and have a very pleasant taste. They are readily acceptable to children.

Each tablet contains 9 grains dicalcium phosphate, 6 grains calcium gluconate, and 660 U. S. P. XI units of Vitamin D. Three tablets (the usual daily prophylactic dose for growing children) provide the equivalent of 7.8 grains of calcium and 4.8 grains of phosphorus. Available in boxes of 51 and 250 tablets.

The capsules are useful as a change from tablets. Two are the equivalent of one tablet. Supplied in bottles of 100 and 1000.

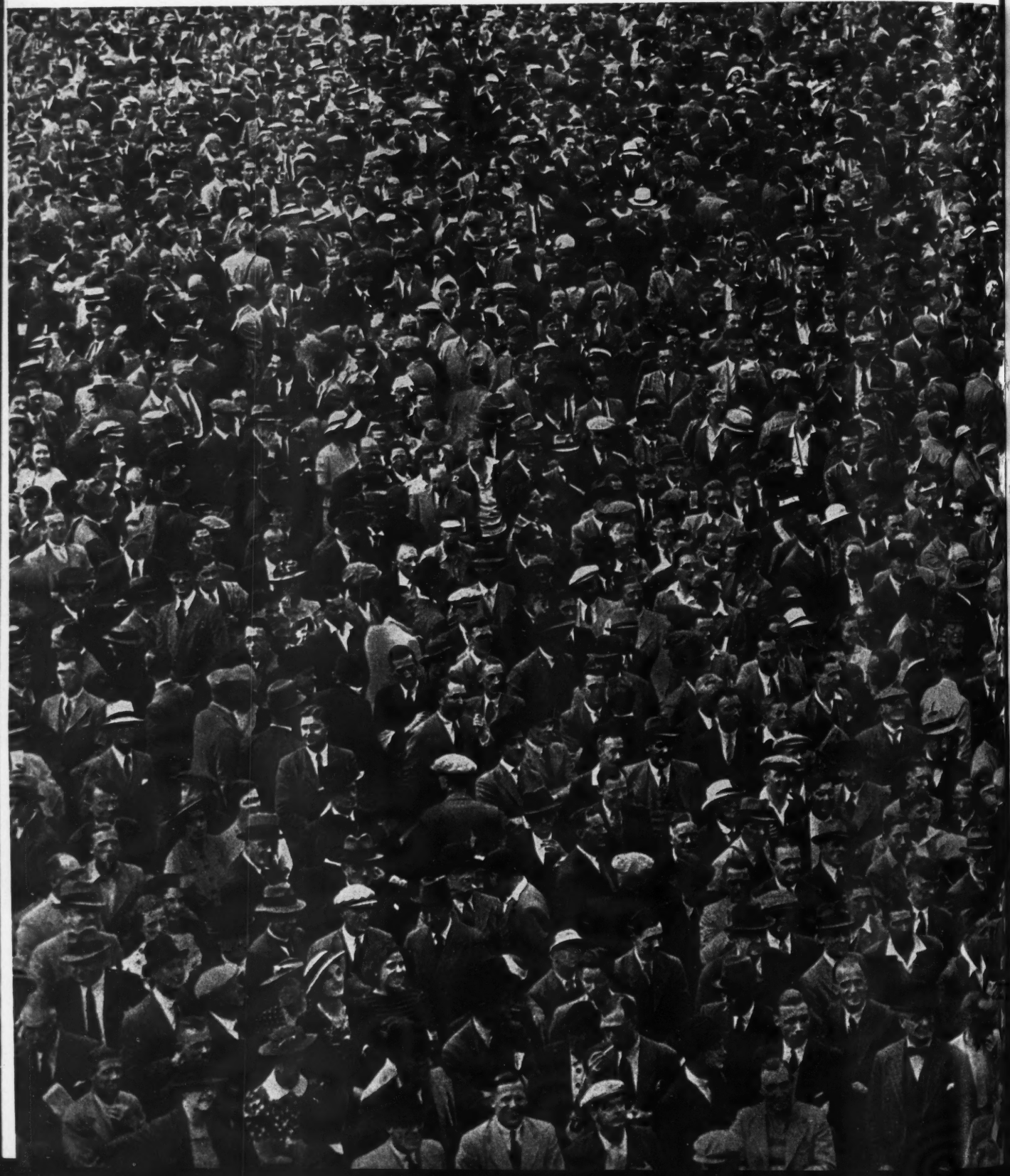
•

For literature write Professional Service Dept., E. R. Squibb & Sons, 745 Fifth Ave., New York

SQUIBB DICALCIUM PHOSPHATE COMPOUND *with* VIOSTEROL TABLETS CAPSULES

(Please use coupon on page 254)

Over 2,000,000



Satisfied patients

confirm your choice when you prescribe Luxene • 37 Dentures today

TODAY a vast multitude of more than two million patients testify to the remarkable and enduring qualities of Luxene • 37 denture material.

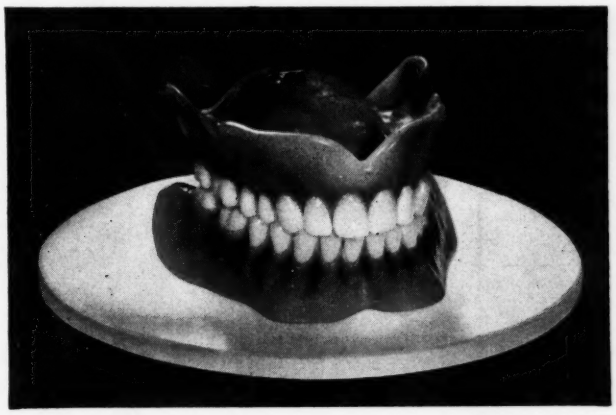
Here is public acceptance on a grand scale. It is an overwhelming expression of confidence that Luxene • 37 resinoid has the right balance of properties to assure denture restorations giving long life and lasting satisfaction.

Time-tested and proven by performance, Luxene • 37 can be relied on to safeguard your priceless professional reputation when you prescribe this fine denture material for *your* cases.

BAKELITE DENTAL PRODUCTS, Inc.
SUBSIDIARY BAKELITE CORPORATION
247 PARK AVENUE — NEW YORK, N. Y.

Luxene • 37 Offers You the Proper BALANCE *of Properties to Conform to your Highest Professional Standards*

Consistent uniformity.
Accurate molding at low pressure.
Good impact strength and toughness.
Dependable color life, life-like translucency.
Chemical and physical stability.
Tasteless. Odorless.
Hard. Compact. Non-absorbent.
Trustworthy mouth performance.
No distortion due to curing shrinkage.
Permanency of form after processing.
No breaking of teeth during processing.
No pulling away from porcelain and metals.
No seepage around teeth.
Ease of repair and reline.



LIFE-LIKE DENTURES FOR LIFE-LIKE SERVICE

·LUXENE·37·*Resinoid Dentures*
REG. U. S. PAT. OFF.

If you are interested in reprints of the two-color feature chart in May DENTAL DIGEST (*pages* 172-175) *here are the prices:*

12 for $ 1.00

25 for $ 2.00

100 for $ 6.50

200 for $10.00

additional 100's $3.00

●

Practitioners everywhere were not long in determining the value of the four-page two-color chart entitled THE CASTLE THAT WAS DESTROYED — see May Dental Digest, pages 172-175. This is the sort of ethical patient-education material for which dentists the country over are looking.

This two-color chart gives every dentist something he can use in showing children the value of dental conservation. It is presented in story form, making it ideal for the child patient.

If you want reprints, just use the coupon order form below. May we urge you to put in your request promptly?

●

The Dental Digest
1005 Liberty Ave.,
Pittsburgh, Pa.

Please enter my order for—

☐ 12 — remittance $1.00 herewith.

☐ 25 — remittance $2.00 herewith.

☐ 100 — remittance $6.50 herewith.

☐ 200 — remittance $10.00 herewith.

Dr. .....

Address .....

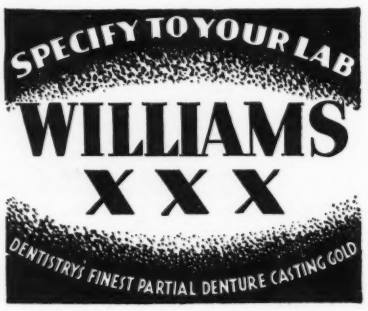
City .....

NOTES ON THE *Cuff*

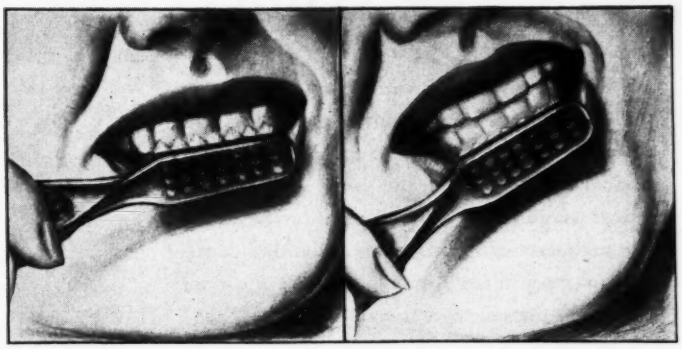
April 24: No one need fear the success of the Milwaukee meeting of the American Dental Association if the enthusiasm of the local arrangement committee under Francis Bull is indicative. The meeting of the Wisconsin State Dental Society in Milwaukee this day suggests that the forthcoming meeting will be the one "that made Milwaukee famous," to borrow from an industry of that city. Up to this date, according to J. P. Justin, there are 2000 hotel reservations. The public relations committee, under Ewald Wetzel, has arranged to have Governor Heil declare a statewide Dental Health Week during the week of the meeting. Wisconsin dentists are helping to arrange vacations for those who wish to take them in the North Woods after Milwaukee week. This department is under the direction of the eminent nimrod and fisherman "Shorty" Martin of Medford, Wisconsin, who when called upon to speak before the committee meeting said that once he stood behind a fellow with a cigar in his (Shorty Martin's) mouth and burned a hole in the seat of the pants of the man in front of him.

In the afternoon Brigadier General Leigh Fairbank speaks before the Society. Dentistry should have a great pride in General Fairbank. Anyone who may have the notion that the Army Dental Corps is interested in stop-gap emergency treatment for soldiers should spend a half hour with the General. The quality of dental care given to the armies of the United States is not only comparable but is superior to that supplied to most people in the civilian population. In supplying to the army the best service that the profession can provide, General Fairbank insists that the professional skill and experience of dental officers must be of the highest quality. In the integration of the dental program with the health of the armed forces, General Fairbank believes that dentistry's greatest progress will come in association with medicine and that we must labor with medicine as a part of medicine. The Dental Corps could not exist as a separate entity from the medical department in the army, as some short-sighted dentists have recommended. To carry on research projects, to treat total personalities, it is necessary that dentists cooperate with physicians and biologic scientists. No place in the world is group practice carried on on a higher plane than in the service medical department. This intimate association of dentistry with medicine carries over into civilian life and tends to raise the influence of dentistry in the civilian population.

April 28: Every year I look forward with eagerness to meeting the graduating class of the University of Illinois College of Dentistry, to talk to the boys on the philosophy of dental practice. To hand came the publication of the United States Department of Commerce which indicates that the net earnings of the average dentist in the United States is $2914. In polling the senior class not one of the men expected to make less than $4300 a year practicing dentistry, and most



Demonstrate Proper Tooth and Gum Care with



D. D. Tooth Brush

Adults and children seldom know how to use the tooth brush correctly. It is a good idea to always keep a D.D. Tooth Brush in the office to facilitate instructions on how to brush the teeth and massage the gums. This practical brush was expressly designed, with the aid of 1,000 dentists, for both tooth and gum prophylaxis. "Thank you!" your patients will say to your recommendation of D.D. Tooth Brush.

BRISTLING WITH GOOD POINTS

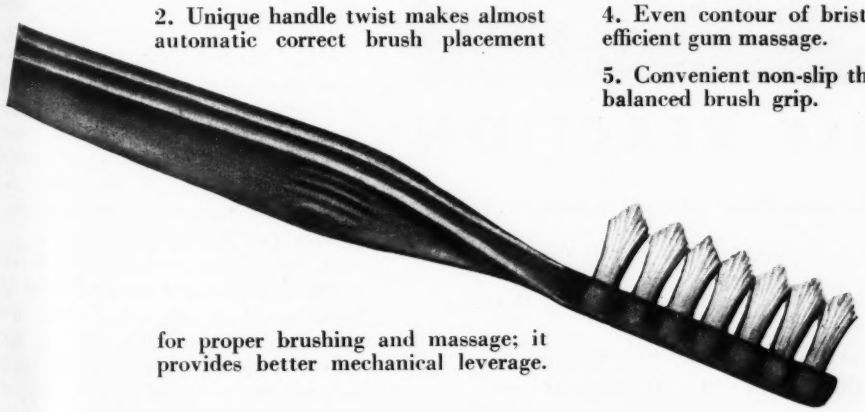
1. Small brush head with bristle knots widely separated for greater cleansing penetration.

2. Unique handle twist makes almost automatic correct brush placement for proper brushing and massage; it provides better mechanical leverage.

3. Long, fine, genuine bristles, good resilience for safe brushing and massage.

4. Even contour of bristle knots for efficient gum massage.

5. Convenient non-slip thumb-rest for balanced brush grip.



BRISTOL-MYERS COMPANY

630 FIFTH AVENUE DEPT. 2 NEW YORK, N. Y.

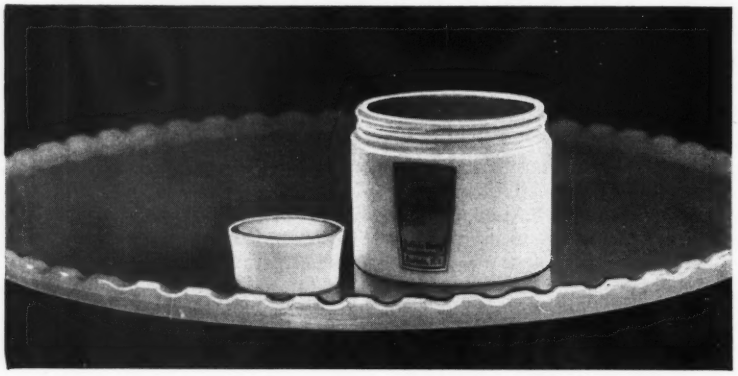
The W. V-B. Ames factory is the only plant in the world devoted exclusively to the development and manufacture of dental cements.

Where Cement Quality Comes From . .

The formula and specifications are only part of the picture where dental cements are concerned. Individuality and development of the various physical properties to the best advantage for clinical usage count more. These derive directly from manufacturing processes. Scientific control does not stop in the Ames laboratory but dominates every factory operation.

The W. V-B. Ames Company, Fremont, Ohio

AMES DENTAL CEMENTS



FAVORABLE REACTION

Buffalo Dental Prohylaxis Paste pleases everyone.

You like it because it does its work efficiently.

Your patients like it because it has a pleasing flavor.

If you haven't used Buffalo Dental Prophylaxis Paste, we will gladly send you a free trial jar.

Standard size package, $1.00 at your Dental Dealer's.

BUFFALO DENTAL MANUFACTURING CO., Buffalo, N. Y.

(*Please use coupon on page* 254)

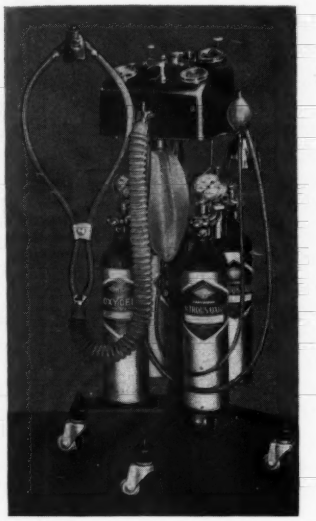
of them expected to make more. Whether this optimism is that of youth or of unrealistic preparation is hard to say, but the fact is that the average earnings of dentists during their peak years is about $75 a week net and these figures are confirmed by many studies. The question emerges: When in the course of a student's training should he be told the reality of dental economic life? Should he be told before he begins the study of dentistry, so that he can turn back before investment is made in the study? Should he be told along the line, so that he might be given an opportunity to withdraw if the future doesn't look bright? Or, should we wait until he is ready to graduate, after a heavy investment has already been made in his education, before he is told the facts of life? I rather think that disappointments and disillusionments could be avoided if there were less of the cloistered atmosphere in dental training and more reality. Every dental college needs the fresh breath of practicing dentists who will speak honestly and realistically about dental practice. Most dental colleges are beginning to accept this idea in inviting practitioners to present informal talks to dental students.

May 3: History repeats itself: Now in the United States there is agitation for the licensing of dental technicians. According to H. L. Eustace of Adelaide, South Australia the same pattern was followed in Australia more than thirty-five years ago, and the degrading influence of this tendency is still operative in Australian dental life today. In 1903 and again in 1917 laboratory technicians were licensed by the Australian government to practice dentistry. These untrained or poorly trained technicians are now the competitors of adequately trained dentists. The result has been that the advance of dental practice in Australia has been obstructed by these poorly trained practitioners of the registry.

If laboratory technicians are allowed to be licensed the public will be endangered in two ways: First, the technicians themselves having the power of licensing and registering will be able to control the supply of technicians in the field. By curtailing the supply, they will be able to create a monopoly and thus raise the prices of dental services to the pub-

(*Continued on page* 248)

ITROUS OXID ANALGESIA ★ ★ ★



THE HEIDBRINK SIMPLEX
Prices begin at $315.00 f. o. b.
Minneapolis, Minn.
Exclusive of cylinders and gas

THE HEIDBRINK SIMPLEX

The Heidbrink Simplex is the ultimate in dental gas machines. Designed to meet all the requirements of various Nitrous Oxid-Oxygen technics for anesthesia and analgesia, including self-administration of the latter by the patient, the Heidbrink Simplex is definitely a practice builder . . . one which will prove a valuable investment to any dentist.

Operation is extremely simple. Once the machine is set for use with a selected technic, all usual anesthesia requirements are met by manipulation of a single valve. This Control Valve starts and stops the gas flow, whether it be the Nitrous Oxid-Oxygen mixture or either pure Nitrous Oxid or pure Oxygen singly. When the mixed gases are shut off, a valve to the breathing line is simultaneously opened to admit air, which is advantageous when applying the inhaler and inserting mouth props.

The Control Valve set at "Patient Control" also permits self-administration of the gases for analgesia by means of a rubber hand bulb.

The dependable performance that has always characterized Heidbrink anesthesia equipment is built into the new Simplex. Highest quality materials and expert workmanship are combined to produce a machine that will deliver an even and accurately measured flow of gas . . . that will respond easily and instantly to the wishes of the operator . . . that will give dependable service over a long period of time.

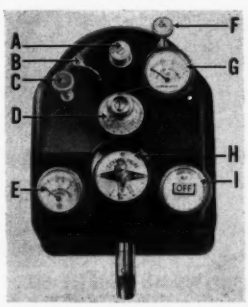
The new Simplex is economical to operate. The accuracy of the controls, ease of operation, and form-fitting inhalers all combine to assist the operator in giving better anesthesias without gas waste.

The Simplex is obtainable in two models, "A" and "B." Both Model A and Model B provide for a variable measured, even, continuous flow of the Nitrous Oxid-Oxygen mixture to the rebreathing bag and also for direct flow to the patient of each gas singly with the bag shut off. The direct flows are intermittent and supply full inhalation volume. They flow to the patient on inhalation and are shut off during exhalation.

The Model B differs in operation from the Model A only in that it has a Shift Valve by which the proportioned Nitrous Oxid-Oxygen mixture can be made to flow intermittently with each inhalation as do the direct flows.

The 3-Gas Simplex provides for the use of Carbon Dioxid.

★



THE OPERATIVE HEAD

A. Pressure Valve
B. Shift Valve
C. Oxygen Regulating Thumbscrew
D. Mixture Valve
E. Oxygen Percentage Gauge
F. CO_2 Regulating Thumbscrew
G. CO_2 Gauge
H. Control Valve
I. Measured N_2O Indicator

A Free Copy of this Book is Ready for You

This advertisement is a reproduction of a part of an interesting, informative sixteen-page book devoted to Nitrous Oxid analgesia. Fill in the coupon and a copy of this book will be mailed to you. The coupon in no way involves any obligation.

THE OHIO CHEMICAL & MFG. COMPANY
1177 MARQUETTE STREET, N. E., CLEVELAND, OHIO

Please send me a free copy of your book, "Questions and Answers on Nitrous Oxid Analgesia."

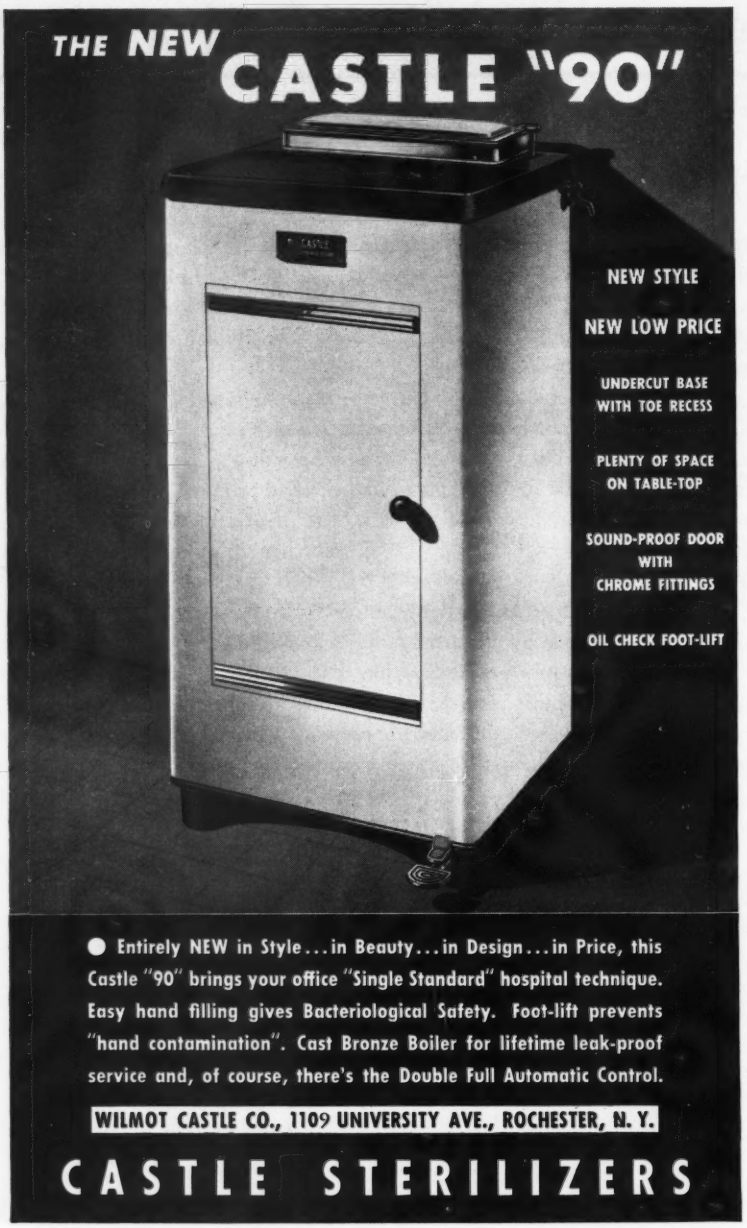
Name .....

Address .....

City .....State.....

(or please use coupon on page 255)

D.D.6


THE NEW CASTLE "90"
NEW STYLE
NEW LOW PRICE
UNDERCUT BASE WITH TOE RECESS
PLENTY OF SPACE ON TABLE-TOP
SOUND-PROOF DOOR WITH CHROME FITTINGS
OIL CHECK FOOT-LIFT
● Entirely NEW in Style...in Beauty...in Design...in Price, this Castle "90" brings your office "Single Standard" hospital technique. Easy hand filling gives Bacteriological Safety. Foot-lift prevents "hand contamination". Cast Bronze Boiler for lifetime leak-proof service and, of course, there's the Double Full Automatic Control.
WILMOT CASTLE CO., 1109 UNIVERSITY AVE., ROCHESTER, N. Y.
CASTLE STERILIZERS

lic. Second, in time they will reach out and try to absorb more and more powers and will eventually ask to be licensed to practice prosthetic dentistry on people, as was done in Australia. With this competition between the technician and the properly trained dentist the entire level of prosthetic practice will be reduced to a European basis.

May 10: Speaking of laboratory technicians, today I attended the Senate hearing in Springfield, the capital of Illinois, on the bill to license dental technicians. In the proposed Illinois bill, two technicians and one dentist would constitute the examining board to determine the eligibility of laboratory workers to become licensed technicians. There is nothing in the bill to indicate when and how often examinations would be held. It would be a simple matter if this bill were to pass for the technicians to decide among themselves how many would be licensed and then cut down the supply by refusing to sit to conduct future examinations.

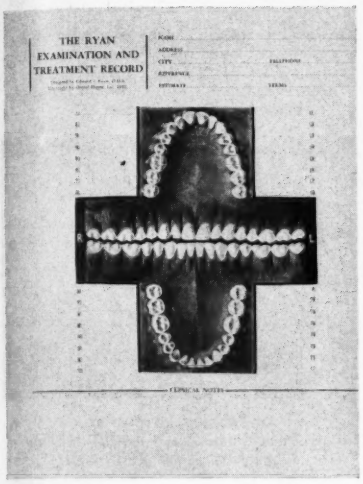
Committees from both the Illinois State Dental Society and the Chicago Dental Society appeared to oppose the bill, and the arrogance of the laboratory owners who are pushing the bill against the wishes of the dental profession suggests that the time has probably come when the dental profession itself must make efforts aggressively to control laboratory services which are now and always will be subsidiary services to the practice of dentistry. The sentiment in Chicago is gaining ground and probably will be reflected in other communities for the establishment of cooperative laboratories operated by dental societies according to the consumers' cooperative plans. If the Rochdale Plan of consumers' cooperatives is followed,

LAVORIS

A fine daily tonic for mouth and throat. Refreshing • Pleasing

Suggestions for the use of

The Ryan Examination and Treatment Record



TYPES OF PENCILS

Yellow	Mongol No. 867
Gray	Mongol No. 819
Red	Mongol No. 866
Blue	Mongol No. 865
Yellow	Castell No. 40
Gray	Castell No. 57

Mongol pencils are made by Eberhard Faber; Castell by A. W. Faber.

SUGGESTED SYMBOLS

Each dentist may develop his own system of symbols but the following specific markings have been found simple and adequate:

Soft Lead Pencil—(a) Porcelain fillings are indicated by a pencil outline.

(b) Porcelair jacket crowns and bridges are shown by cross-hatching with lead pencil across the corresponding tooth or teeth on the chart.

(c) Missing teeth are blocked out with a soft lead pencil.

(d) Abrasions are represented with soft lead pencil.

Blue Pencil—(a) Cavities are indicated with blue pencil.

(b) Advisable restorations are demonstrated with blue pencil.

Red Pencil—(a) A red line is used to indicate the presence of a root canal filling.

(b) A red outline shows the presence and position of an impacted tooth.

(c) Red pencil is used to represent pulpi nvolvement.

(d) A red "X" is made across a tooth to ndicate that its extraction has been advised.

(e) Pyorrhea pockets are represented in red along the crest of the alveolar ridge (and a notation is made at the bottom of the chart if extensive gingivitis is present).

1. The Ryan Examination and Treatment Record may be had in pads of fifty charts each. These pads fit conveniently in a standard 9½ by 11½ inch loose-leaf notebook which may be purchased at a five-and-ten cent or variety store.

2. Alphabetical dividers may be made by using a ten cent package of plain white paper of the same size as the charts with holes punched at the same distances, and a fifteen cent box of alphabetical index tabs. The holes are reinforced.

3. It is a good plan to keep a blank sheet of paper between the charts to prevent possible smearing of crayon or pencil markings; but this is not essential.

4. A fresh pad of charts may be kept ready for use in back of the notebook of active records.

5. The various types of restorations and their location in a particular mouth are shown with the use of polychrome pencils—gray, for amalgam; deep yellow, for gold. White pencil does not show up very well; consequently, porcelain may be indicated with soft lead pencil outlines or cross-hatching.

6. Spaces provided beside the quadrants with numbers corresponding to the teeth permit special notations concerning each tooth. As treatment progresses the blue markings indicating needed dentistry are erased, and the nature, location, and date of placement of each new restoration are recorded. Additional clinical notations are made if necessary in the space provided for that purpose below the chart itself.

7. It is essential to be consistent in any system of symbols or markings developed. To insure consistency, it is well to have a key page in the front of the notebook.

8. The exact record of conditions found in the average patient's mouth at the original examination can be completed in fifteen or twenty minutes, and the time it takes to keep a chart up to date is negligible.

9. When a chart is completed the necessary data (name, address, telephone, reference, estimate, and terms) are typewritten in the spaces provided at the top of the record. The date of the original examination is also recorded in order that the treatment dates (as shown in the quadrants at the sides of the chart) will be recognized as subsequent to the date of the original examination.

10. Provision is made on the back of the chart for bookkeeping records. This is merely for the convenience of dentists who wish to keep all records together, but may be ignored by dentists who have a satisfactory bookkeeping system which they need not and do not wish to discard. The Ryan Examination and Treatment Record may be employed as an additional or supplementary record to any established method of record-keeping dentists may have.

11. Although the Ryan Examination and Treatment Record was designed for the dentist's own convenience in his practice, the charts have been found to have a definite informative value in explaining conditions to patients. The charts are also particularly helpful in reporting dental conditions of patients to cooperating physicians.

THE DENTAL DIGEST, 1005 LIBERTY AVE., PITTSBURGH, PA.

Here is $1.00. Please send me a pad of 50 Ryan Examination and Treatment Record Charts.

Dr. ..... Address .....

City ..... State .....

If you have not ordered your charts, clip the coupon, and mail with a dollar bill.

The McKesson EASOR

an Investment not a Purchase

Dentists who are using the McKesson Easor look upon it as a sound investment, rather than an equipment purchase. These dentists have learned that nitrous oxid analgesia with the Easor has several dividend-paying advantages.

PRACTICE BUILDER: The Easor makes dental treatment easier and thus eliminates the *fear* that keeps people out of dental offices.

DECREASES BROKEN APPOINTMENTS: Patients do not dread the next appointment when they have experienced treatment with the aid of McKesson analgesia.

EASIER OPERATING CONDITIONS: Calm, relaxed patients are easier to work upon. The Easor eliminates much of the nervous strain and fatigue from operative work.

SAVES TIME: When operative pain is controlled, operations can be completed in less time. The Easor is a time saver.

You can appreciate the far-reaching advantages of nitrous oxid analgesia only when you understand the safeguarded efficiency and simplicity of the Easor. Return the coupon for complete details.

McKesson Appliance Co. 6-39 DD
Toledo, Ohio

Send me complete information on theEaso r

Dr. .....

Address .....

City ..... State .....

Dealer .....

(*Or please use coupon on page* 254)

which has been so successfully administered in European countries for the distribution of consumption goods, quality service will be demanded, and the savings from cash payments will reflect to the credit of the dentist and the patient.

Many dental societies in the country are in strong financial position and they could, if they chose, set up laboratories under their own control. It would be regrettable if under this proposed plan existing properties, as represented by laboratories now operating, would be destroyed. But whenever groups, subsidiary to the dental profession, take it upon themselves to run aggressively contrary to the wishes of the dental profession, the profession is entirely within its right to protect itself from unfriendly acts.

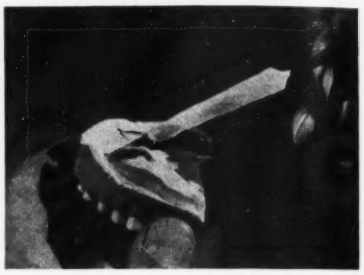
Back to Peoria from Springfield at 75 miles an hour with Frank Hurlstone at the controls to attend the general session of the Illinois State Dental Society meeting and to discuss the paper of C-E. A. Winslow, about which some editorializing in this issue's Editor's Page.

May 19: One month from now the Milwaukee meeting of the American Dental Association will be under way. Throughout the country there are men sitting up late at night, writing papers and working in their laboratories preparing clinical material. With packing boxes full and brief cases stuffed to overflowing, these men will appear in Milwaukee to give to their colleagues the fruits of their hard efforts. A paper that may take twenty or thirty minutes to read may take the author weeks to prepare; he no doubt tossed at night; was irritable with his family and even his patients while this paper of his was under preparation—then, a short half hour of reading his ideas, often to a yawning, bored, somnambulent audience. Those clinical models so carefully polished and packed like jewels in a case are roughly and carelessly handled by some thick-thumbed dentist at a table. Most of us have only to receive when we go to a convention. We go there presumably to hear and to see and to learn. Not often are we appreciative enough of the labors, the time, the effort, the difficulties, the expense that a clinician has gone to to produce his clinic. Not very often do we thank an essayist or a clinician for his contribution.

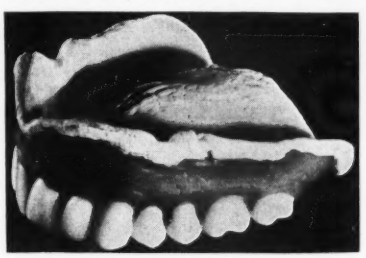
(*Continued on page* 252)

A Thin Layer . . . but What a Difference!

The coating of Dr. Kelly's Impression Paste (applied to an original impression, an old denture, or a waxed-up case) may average no more than one millimeter in thickness—but what a difference it makes in the final result—the new or rebased denture!



For this small amount of the thin corrective Paste flows into all irregularities of the soft tissue, and hardens in a few minutes to a tough, smooth surface in which every natural feature and every point of undesired compression are faithfully recorded.

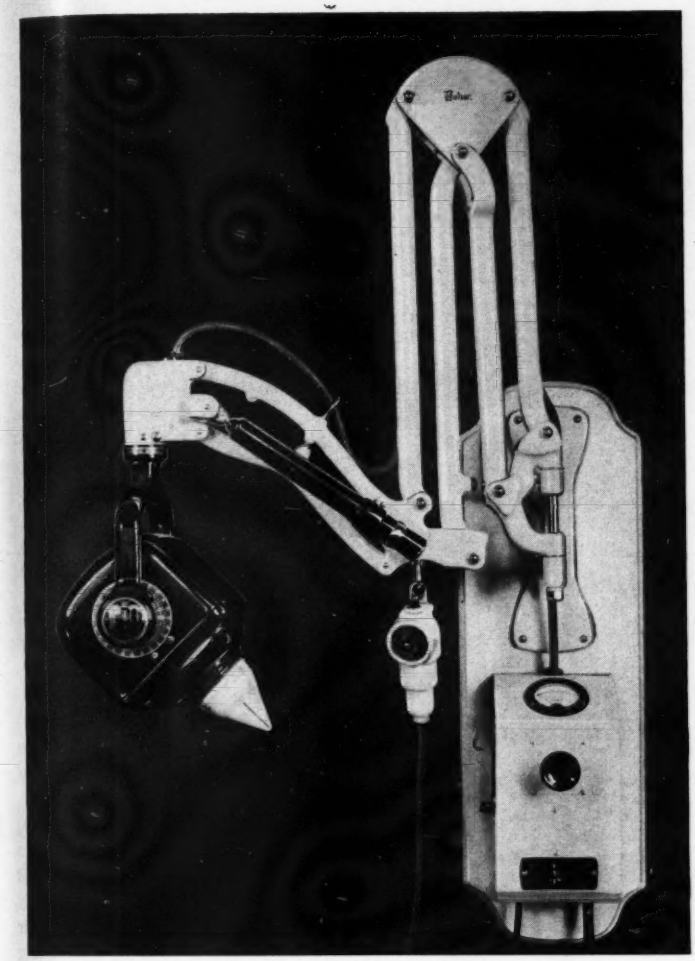


Suggested technics, including those for full and partial denture construction, are given in a folder, gladly sent on request. Why not try this way to better dentures, used successfully by leading men the world over?

Order from your dealer. Full credit if you don't like it. Package $2.50 (only a few cents an impression). Kelly-Burroughs Laboratory, Inc., 143 N. Wabash Ave., Chicago, Ill.

Dr. KELLY'S Impression Paste

(*See Handy Coupon, page* 255)



Weber Raydex No. 6 Wall Type. $675 Eastern Zone.

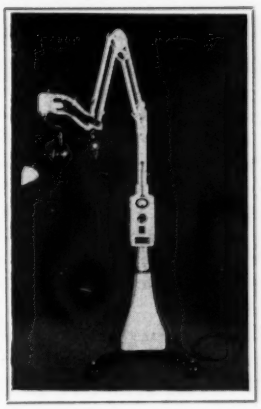
NEW

in x-ray engineering
in attractive design
in simplified technique
and in ECONOMY

The Weber Raydex No. 6 is an entirely new development in the manufacture and design of dental x-ray equipment. It combines every modern development of x-ray science and provides every characteristic of control, penetration and flexibility essential to successful x-ray performance at a price well within the reach of every dentist who wishes to avail himself of the far-reaching advantages of x-ray equipment.

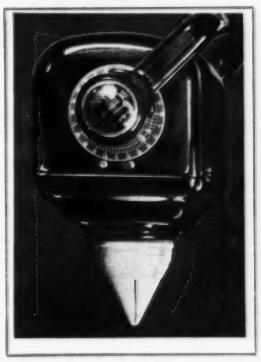
The manually controlled auto-transformer allows for a sufficient variation in line voltage to permit adjustment to any dental office requirements. The effective voltage available at the tube is 45,000. The Raydex No. 6 is equipped with a Benson straight line focus tube and the Weber reversible timer. In every detail it is an attractive, dependable, efficient x-ray, guaranteed by the Weber full guarantee.

The Raydex No. 6 typifies the splendid skill of Weber engineers and the high quality standards of Weber Manufacturing methods. You can appreciate its excellence only by examining every detail. Let us send you descriptive literature. There will be no obligation. Return the coupon on page 255.



The Raydex No. 6 can also be had in mobile type. The bracket and control box are attached to a graceful column which is mounted on a firm movable base. The price of this type is $720.00 Eastern Zone.

"Models To Suit Every Office Need"



The head containing the oil immersed tube and transformer is 100% electrically safe. The precision with which it is mounted permits ease of manipulation and at the same time assures a *dead* steadiness after the head is positioned.

WEBER DENTAL MANUFACTURING COMPANY CRYSTAL PARK CANTON, OHIO

FOR 40 YEARS MAKERS OF FINE DENTAL EQUIPMENT

"My Auxiliary EYES"

That's what a Dentist friend of ours calls his set of KERR Mouth Mirrors. And he declares that, for clear vision, these auxiliaries are almost as important as his originals.

To assure flawless accuracy, every KERR lens is painstakingly ground and polished. It is then tested to definite, rigorous standards of performance. The image it shows you must be sparklingly brilliant, faithfully reflected and free from all self-developed cross-lights.

To many Dentists, the first experience with a KERR Mouth Mirror has been a delightful revelation. Image is so surprisingly clear, and work so sharply defined that confidence and speed are notably improved.

Give your skill—and your eyes—a fair chance with KERR Mouth Mirrors!

DETROIT DENTAL MFG. COMPANY

KERR MOUTH MIRRORS

REG. U.S. PAT. OFF.

COMFORT AFTER EXTRACTIONS

Mu-col

Cooling and soothing, MU-COL aids normal granulation and reduces the risk of infection. Distinctly superior to ordinary saline solutions, MU-COL has been used and recommended by dentists for over 20 years. Valuable as a general mouth wash; to combat unpleasant breath and as a cleanser for dentures. In powder form, MU-COL is quickly soluble and does not deteriorate.

PLEASE SEND MU-COL SAMPLES

THE MU-COL CO.
Dept. DD-69
Buffalo, N. Y.

Name ..... D.D.S.

Address .....

(*Or please use coupon on page* 255)

Not very often do we bother to shake the hand of an essayist or a clinician to show that we appreciated his efforts. We ought to remember that he is not being paid.

Too often one observes someone in attendance at a lecture or clinic who delights in embarrassing the person who is presenting his ideas. Such pestiferous conventioners ask obtuse or unimportant questions which they usually answer themselves. They are the hecklers at the meeting and should be treated as hecklers are often treated—with the well known grip at the nape of the neck and a forward propulsion of the knee a posteriori.

We have all seen splendid group clinics, prepared at great effort and expense, presented before an audience of less than a dozen. There is a spirit in the professions which is not found in any other vocation or business and which is not fully appreciated. It is inconceivable that business competitors meeting together would be anxious to tell one another the secrets of their crafts. To be sure, businessmen do meet together but usually to peg prices and to maintain sales for their products. Dentists and physicians meet to give, gratuitously and without strings attached, of their research and their studies and their experience. The ideology of the professional spirit is to give freely of one's discoveries and not to withhold for exploitation or profit. There is no talk at society meetings regarding price-fixing or how a scientific discovery can be exploited to the profit of the producer. This unselfish professional spirit, the spirit of sharing within the group, must be encouraged and perpetuated. The least that those of us on the receiving end can do is to attend the meetings and the clinics, listen attentively, applaud generously, and thank profusely.

A long experience in attending dental meetings has emphasized the paradox that the men who need instruction least and are the most proficient dentists are usually the ones in diligent attendance, and the dentists who need training most usually do not attend the meetings at all.—E. J. R.